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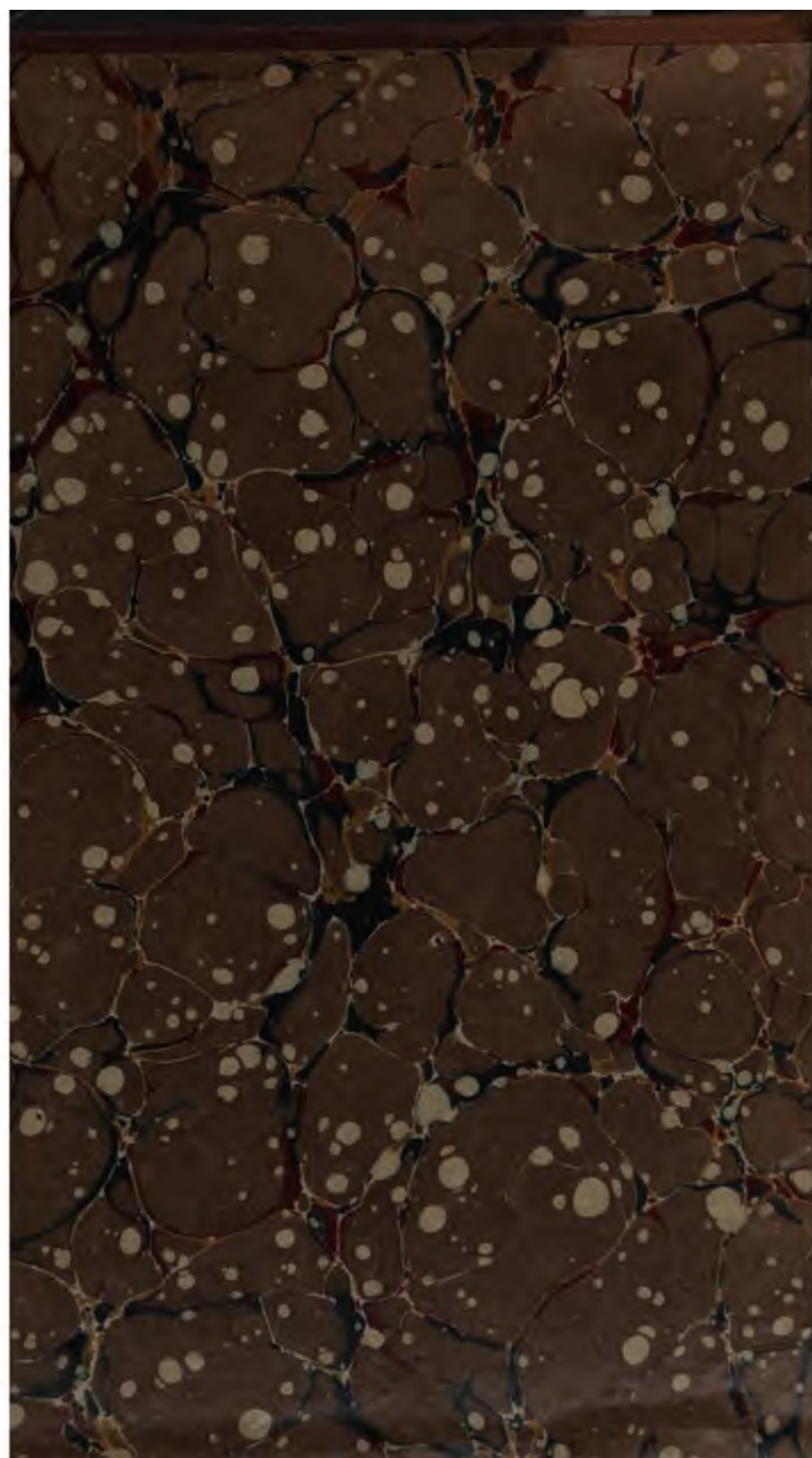
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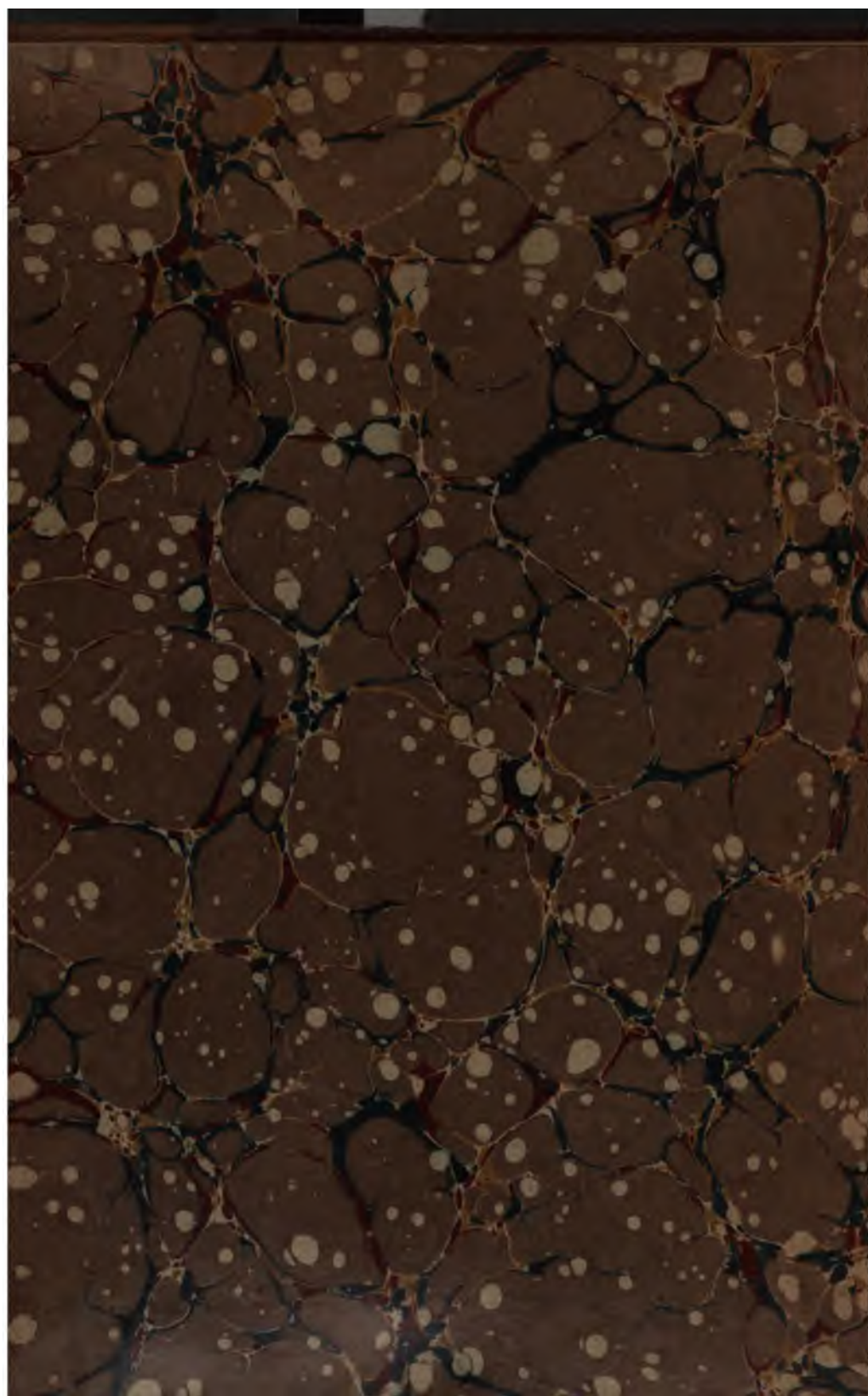
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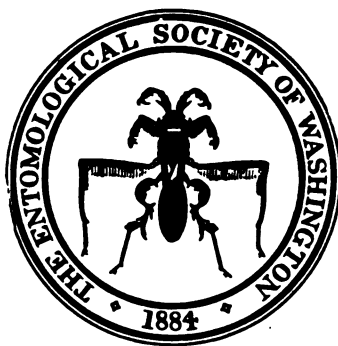
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PROCEEDINGS
OF THE
ENTOMOLOGICAL SOCIETY
OF
WASHINGTON.



Volume VII, 1905.
(Meetings of October 6, 1904, to October 5, 1905.)

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PROCEEDINGS
OF THE
ENTOMOLOGICAL SOCIETY
OF WASHINGTON.

VOL. VII.

JANUARY, 1905.

No. 1.

OCTOBER 6, 1904.

The 189th regular meeting was held at the residence of Dr. Wm. H. Ashmead, 1807 Belmont avenue, N. W., Vice-President Hopkins in the chair, and Messrs. Ashmead, Barber, Currie, Doolittle, Dyar, Gill, Hay, Heidemann, Morris, Patten, Schwarz, Stiles, Ulke, and Webster, members, and Messrs. Phillips, Strauss, and Charles B. Dyar, visitors, present.

Dr. Gill, as a delegate from the Society to the International Geographic Congress held in Washington the month previous, made a brief report.

—Mr. Schwarz exhibited a pamphlet published in Havana, Cuba, by the "Instituto de Segunda Enseñanza" and entitled: "Catalogo Numerico del Museo Zoologico Cubano (Museo Gundlach). Habana, Cuba, 1895." The pamphlet comprises 112 pages and is manifestly intended to serve as a guide to Gundlach's "Fauna Cubana" as illustrated by the specimens in the Gundlach collection now preserved at the "Instituto." At any rate the pamphlet seems to be entirely unknown to zoologists. While at Havana, Mr. Schwarz ascertained that this "Catalogo" is an exact reproduction of Dr. Gundlach's manuscript field-book, in which Gundlach entered each species found by him in Cuba, from mammals down to insects, without any systematic order; except that for each Order a separate set of numbers

was used. As matters stand, this pamphlet is of little scientific value (except for specific localities mentioned by Gundlach), since the families, genera and species are listed without any systematic arrangement. If a little circumspection had been used in editing the pamphlet for publication it would have been an excellent check list of the animals found in Cuba by Gundlach. As to the insects, the Orders Diptera and Coleoptera are not included in the pamphlet, and Mr. Schwarz was informed by the authorities of the "Instituto" that there were no funds to continue and complete the publication of the "Catalogo." The date on the title page of this pamphlet is misleading, as are also the dates on the other works on the Cuban fauna by Dr. Gundlach, published in Havana by the Academy of Sciences or otherwise, the title pages, with the date, being always printed as page 1, while the publication of the body of the volumes extended over several subsequent years.

Mr. Barber stated that a collection of land shells from Nassau, Bahama Islands, received a few days ago by the Division of Molluscs in the National Museum, was found to be swarming with a small dipteran. The matter was called to his attention, and upon visiting the collection he recognized the flies, by their erratic, jerking movements, as belonging to the family Phoridae. The snails were dead, but not wholly dried up, and there was considerable odor about them. He noticed that although some of the flies flew readily (the ♂♂), others (the ♀♀) were wingless. He collected a number of both forms in different stages, and these were determined by Mr. Coquillett as belonging to *Phorophora occidentalis* Melander and Brues, originally described, about a year ago, under the genus *Stethopathus*, from three specimens collected at Wood's Hole, Mass., at a place where burrows of *Haliotis* were abundant. It was then inferred that the flies had some symbiotic relation with these bivalves. A winged ♂ was taken at the same time by the authors just mentioned, but was thought to belong to some other species on account of differences in the head. Mr. Coquillett told Mr. Barber that the head in the ♂ collected on the snail's differed considerably from that of the ♀, and he believed that the specimen obtained by Brues and Melander was the true ♂.

of this species. Mr. Barber stated that there are some differences between Melander and Brues' figure of the ♀ and his own specimens in the length of the joints of the front and hind tarsi, the most striking difference being in the basal joint of the hind tarsus, which, in his specimens, is very broad and has a beautiful set of diagonal rows of bristles, similar to that found on the same joint in beetles belonging to the genus *Mordellistena*. Mr. Barber thought it improbable that a wingless ♀ could have had a chance to oviposit in the collection since the introduction of the latter into this country, and he believed that the flies should be labeled as coming from the Bahamas. Microscopic and pinned specimens of adults, ♂ and ♀, and larvæ and pupæ were shown, as also Melander and Brues' published figure.

Discussing this note Mr. Currie mentioned having found Phorid flies in a cigar box of insects sent to the National Museum from the Hawaiian Islands by Dr. Ashmead during the summer of 1901. They had bred from several large dragonflies of the genus *Anax*, eggs of the Phorid having undoubtedly been deposited on them shortly after they were collected and before they were packed for shipment.

—Dr. Stiles entertained the Society with a short account of the work done at the International Zoological Congress which met at Bern, Switzerland, the past summer. He stated that there were 400 members present, 26 of whom were Americans. Unfortunately he was unable to attend any of the meetings devoted to entomology, since his position on the committee on rules of nomenclature kept him closely engaged for 18 days. He mentioned in brief the work of that committee and stated that the code as revised and adopted is now in type and will be published in English, French, and German.

—Dr. Ashmead, under the title "New Hymenoptera from the Philippine Islands," reviewed the work that has been done upon Philippine Hymenoptera and mentioned the sources of material from that region which has come into the possession of the National Museum. He also exhibited a box containing some of the more interesting species from recent sendings and made comments upon them. He called special attention to a specimen of the hitherto undescribed ♀ of the ant *Sima allo-*

borans Walker. In conclusion, he stated that there are now about 240 species of Philippine Hymenoptera in the collection of the National Museum—probably not over three per cent of the species which will eventually be found in those islands.

Referring to the subject brought up by Dr. Ashmead of species of ants known only from one sex, Mr. Schwarz stated that in Cuba the winged forms of some species of ants are brought out in enormous numbers by the summer rains. Yet he has never, even after repeated attempts, been able to find the winged forms of *Dorymyrmex pyramicus* Roger, the "Lion ant" of the Cubans, which in that country plays the rôle of the Guatemalan kelep (*Ectatomma tuberculatum* Olivier) by protecting solitary cotton trees from the boll weevil (*Anthonomus grandis*). He had not found it possible to dig down to the real nest of *Dorymyrmex*. Mr. Barber stated that only in one instance had he seen ♀ ♀ of the common Texas harvesting ant (*Pogonomyrmex barbatus*). This occurred last summer on the stage road between Brownsville and Alice. The ground for an area of about 30 feet was densely covered with ♂ ♂ and ♀ ♀ scrambling over one another. The sight was a novel one, and attracted the attention of everyone on the stage.

—Dr. Dyar read a paper, by Mr. Currie and himself, entitled "The Egg and Young Larva of *Culex perturbans* Walker,"¹ after which, in discussing the possible habitat of the larva, Dr. Dyar mentioned a suggestion made to him by Dr. Howard, which seemed plausible, viz., that the larva may be found to live in bodies of stagnant water thickly covered with algæ—situations which have heretofore been considered unfitted for mosquito larvæ—and that its curiously constructed air tube may serve to penetrate the mass of vegetation, thus enabling it to secure air from the surface. He had not yet had an opportunity of testing the theory.

Dr. Hopkins stated that during the past summer he had discovered a number of mosquito eggs belonging to the genus *Megarhinus* on the surface of water in a rain barrel at Kanawha Station, West Virginia. Only one of the eggs hatched. The

¹ Published in Proc. Ent. Soc. Wash., vi, No. 4, pp. 218-220, 1 fig.; author's extras published November 4, 1904.

larva issuing from it was furnished with a live *Culex* larva about twice its size. The *Megarhinus* seized the *Culex* by the anal segment and gradually devoured it. It was then furnished with a *Culex* larva of still larger size and it found, upon grasping this larva as it did the first one, that it could not maintain its hold, but was shaken off. The *Megarhinus* thereupon changed its tactics and grasped the *Culex* by the prothoracic segment. This ruse was successful, for the *Culex* was then unable to free itself from the *Megarhinus* and was relentlessly devoured. All larvæ subsequently attacked by *Megarhinus* were seized by the prothorax regardless of their size. Dr. Hopkins stated that this was the only time he had found *Megarhinus* in West Virginia.

Mr. Schwarz said he believed it would be well to explore for mosquito larvæ pools whose water was covered with the iridescent film of oxide of iron. He thought it quite possible that interesting and peculiar larvæ might be found inhabiting such situations. He mentioned the location of a spring pool of this character near Plummer's Island, Maryland. Dr. Hopkins stated that he had found larvæ in film-covered pools in the neighborhood of coal mines. Dr. Dyar remarked that these were in all probability the larvæ of *Culex pipiens*. Dr. Hopkins questioned Mr. Barber as to whether *Megarhinus* adults were known to bite, Mr. Barber replying that he thought instances of their biting were known.

—Mr. Schwarz exhibited a box of the ears of the grass *Cenchrus echinatus* Linn., collected by him at Cayamas, Cuba, in May, 1904, with numerous specimens of large-sized insects captured by the spinous spicules of the grass. He has prepared the following abstract of his remarks:

THE INSECT-CATCHING GRASS OF CUBA.

BY E. A. SCHWARZ.

[*Author's Abstract.*]

Cenchrus echinatus Linn. is a widely distributed grass in tropical countries, both in the Old and New Worlds, but its insect-capturing capacity seems to have hitherto escaped the attention of botanists and entomologists alike. In the sugar-cane growing regions of central Cuba it occurs plentifully along the road-

sides between the sugar-cane fields, and at the commencement of the rainy season (end of April and first part of May), which is also the season of the swarming of a great number of insects, the ears of the grass are loaded with a multitude of large insects, mostly Coleoptera, captured by the spiny involucre of the spikelets of the grass. It is evident that the insects are captured while flying against the minutely barbed spines, and that almost always they are held fast by the hind wings, very rarely by some other part of the body. Among the numerous species found on the ears of the grass are some of the most powerful Coleoptera of Cuba, for instance, the well-known "Cucujos" (genus *Pyrophorus*) and the "Gallegos" (night-flying Scarabæid genera *Lachnosterna*, *Cyclocephala*, etc.), but none of them are ever able to free themselves from the death grip of the grass. The following list includes only those species which could be picked off the ears of the grass in thousands of specimens within half an hour's walk. Night-flying species: *Pyrophorus noctilucus*, *P. havaniensis*, *Monocrepidius bifoveatus*, *M. lividus*,¹ *Glyphonx fuscus*, *Lachnopus curvipes*?², *Lachnosterna crenaticollis*, *L. patruelis*, *L. suturalis*, *L. dissimilis*, *Cyclocephala signata*. The day-flying Coleoptera are: *Cycloneda sanguinea*, *Thonalmus*, two or three species, *Exophthalmus scalaris*, *Anoplosiagon pallidum*.³ The Hymenoptera are represented by numerous specimens of *Apis mellifera*; the Diptera by *Mallophora orcina* (?), and the Neuropteroid insects by several species of Odonata. For reasons which I cannot explain, the Lepidoptera, Hemiptera, and Orthoptera were not represented among the insects thus captured. Very small insects, such as ants and small beetles of various families are able to walk with impunity over the barbs of the grass; and there are two large-sized species, viz., the grass-seed feeding earwig, *Apterygida linearis*, and a grass-seed sucking Pentatomid bug, *Ebalus pugmax*—both excessively common in Cuba during the rainy season—which are able to brave the dangers of the grass.

The rather extensive subject of insects caught by plants may be divided into the following topics:

¹ This and the preceding species as well as various other large-sized Elateridæ that are attracted by light are popularly called in Cuba "Cucujos ciegos," blind Cucujos, because they lack the luminous, eye-like thoracic spots.

² I experience some difficulty in the specific determination of this species. It is by far the most abundant, the most voracious and most polyphagous Otiorhynchid beetle in central Cuba. It is active both at day and night.

³ This little Scarabæid beetle flies about in countless numbers for an hour or so after sunrise, and in much smaller number just at sunset.



PLATE I.
THE INSECT-CATCHING GRASS OF CUBA.

A. Insectivorous plants, as exemplified by *Sarracenia*, *Darlingtonia*, *Drosera*, *Nepenthes*, *Utricularia*, and *Oenothera speciosa*. This phase of the subject has often been presented in print, both in the scientific and popular literature.

B. Insect-catching, but not insect-devouring, plants, the plants deriving no conceivable benefit from the capture of the insects. There are innumerable instances of this sort and the phenomenon is so common that, generally speaking, no particular attention has been given to it by entomologists, excepting in one case, viz., the insects preserved in amber or gum animé, concerning which quite an extensive literature has arisen. This whole phase of plants catching insects in an accidental or apparently accidental way may again be subdivided as follows:

1. *Plants capture insects by means of sticky surfaces or exudations, which may occur on the stems, leaves, flowers, or any other part of the plant.* In many instances these exudations have apparently no attraction to insects. In other instances sticky or gummy substances, exuding from wounds or other injury received by plants, attract and capture insects by the odor of the excretion—as exemplified by the resin of our coniferous trees. Finally, such exudations, when fermenting, possess intoxicating properties and attract and drown many, often large-sized, insects. Of this character are the exuding saps of oaks, birches, sugar maples, and other trees.

2. *Sharp blades of grasses capture insects.* This is a rare phenomenon, but is referred to both in the European and North American literature. Diurnal or crepuscular insects, mostly Coleoptera, while slowly flying about get caught by the grass in such way that the blade enters the angle formed by the bases of the fore and hind wings. The insects caught in this particular position are entirely unable to free themselves, and perish.

3. *Insects are caught by the hairy surfaces of plants.* This is also a common occurrence of a purely mechanical and accidental nature. Small and weak insects, usually Diptera, fly against the hairy stem or leaves of plants, *e. g.*, our common mullein, and are unable to extricate themselves from the dense mass of hairs.

4. *Crepuscular or Nocturnal Lepidoptera caught by the tongue by the flowers of *Physianthus albens* and other asclepiadaceous plants.*

5. *Insects are caught by spinous plants*, for instance, thistles and cacti. These do not capture any insects except that in very rare instances a specimen gets impaled by flying against the spines. There is in Cuba a second species of *Cenchrus* just as spinous as *Cenchrus echinatus*, but the spines point upwards so that insects which happen to fly against the ears of the grass

can easily free themselves. In the case of *Cenchrus echinatus*, however, the spines or barbs along the involucre of the ripening seeds point downwards and form a perfect and infallible trap for any insect that flies against the ears of the grass.

In spite of the fact that even in a very small area untold thousands of insects are thus captured every night or day by this *Cenchrus echinatus*, there appears to be no ground for believing that the plant derives any benefit from their capture, and the phenomenon must be classed among the numerous instances of plants accidentally capturing and killing insects.¹

In discussion, Mr. Morris observed that an allied species of grass, *Cenchrus tribuloides*, the common sand burr, had been found by him along the shores of Lake Michigan in northwestern Indiana and northeastern Illinois with certain species of flies caught in its spines. Mr. Schwarz said that Elaterid beetles caught by the grass live for three or four days and then decay. He had never seen any insects caught by the sand burr in Florida.

The subject of insects impaled on thorns was then brought up, Mr. Schwarz maintaining that such cases are the work of shrikes and do not result from accident. Mr. Hay stated that he had found insects in central Indiana—mostly grasshoppers—impaled upon the barbs of barbed wire fences, and this in a region where shrikes are quite rare.

NOVEMBER 3, 1904.

The 190th regular meeting was held at the residence of Dr. H. G. Dyar, 1512 Twenty-first street N.W. Vice-President Banks presided, and there were present Messrs. Barber, Benton, Currie, Doolittle, Dyar, Gill, Hay, Heidemann, Hopkins, Morris, Patten, Piper, Ulke, and Webb, members, and Messrs. Charles B. Dyar and H. J. Nichols, visitors.

—Mr. Barber exhibited ♂ and ♀ specimens and larval skins of a rare Dermestid beetle, and furnished the following abstract of his remarks:

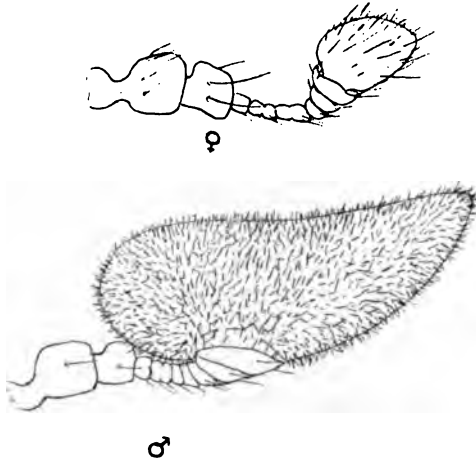
¹ The preservation of the insects caught by the grass proved to be a difficult matter, and some of the finest examples of ears, notably one that had captured three specimens of *Pyrophorus noctilucus*, were lost, partly by the decay of the specimens and partly by the attacks of house ants. Those I brought to Washington were pinned in a box which was kindly photographed by Prof. A. A. Doolittle.

NOTE ON THAUMATOGLOSSA (AXINOCERUS) AMERICANA JAYNE.

BY HERBERT S. BARBER.

[Author's Abstract.]

On April 24, 1904, I found on the bark of a hackberry tree, at Victoria, Texas, a mass of Mantid eggs about which were numerous specimens of a Chalcid (*Podagrion mantis* Ashm.), and thinking that I might breed other parasites, I took a chip of the bark with the mass on it and put it in a tin box. On looking at it a few days later I noticed several Dermestid larvæ which interested me, but as there was much else in the strange country around Brownsville to interest me I did not pay much attention to them. On June 10th the adults were alive, and on the 20th they were dead. Mr. Schwarz identified the species as *Thaumtoglossa* (*Axinocerus*) *americana* Jayne, of which he had previously taken two specimens in Lavaca Co., Texas, on the flow-

FIG. 1.—*Thaumtoglossa* (*Axinocerus*) *americana* Jayne:

♂ and ♀ antennæ.

ers of *Bumelia lanuginosa* (one, the type, is now in the LeConte collection). A third specimen, which he took in the gall of a Coccid (*Olliffiella cristicola* Ckll.) on oak (*Quercus oblongifolia*) in the Santa Rita mountains, southern Arizona, is much larger and may represent another species of the genus. I bred sixteen specimens in all, four of which are males. The accompanying figure (fig. 1) illustrates the antennæ of both sexes.

—Mr. Heidemann exhibited specimens and presented the following description of a new hemipteron belonging to the genus *Anasa*:

DESCRIPTION OF A NEW *ANASA* FROM NORTH AMERICA.

BY OTTO HEIDEMANN.

Anasa repetita, new species.

Elongate-oval, uniformly brown or light brown. Upper surface of body, and breast, with irregular rows of dark punctures; from each puncture arises a short, stiff, golden bristle; abdomen transversely wrinkled, the punctures somewhat obsolete, with finer and longer hairs which are more closely placed on the apex of abdomen. Head without a spine or tubercle near the antennæ; ocelli amber-colored, blackish-edged behind; antennæ moderately long and finely pilose; basal joint one-third longer than the head, gradually curved, brown, with a black line exteriorly and a few black dots; the black line even reaching the antenniferous tubercle; second joint a little longer than the first; the third nearly equal in length with the second, both joints about half as thick as the basal joint, black, narrowly yellowish-white at base; terminal joint shorter, fusiform and orange-colored. Rostrum reaching the middle coxæ, light brown, black at tip. Thorax broader than long; the disk feebly convex, in the middle a longitudinal narrow, smooth whitish line; lateral margins slightly sinuate anteriorly, and obtusely rounded posteriorly near the humeri; the anterior margin less than half as broad as the posterior; the latter considerably depressed and straight, the transverse raised line above the margin well defined. Scutellum wrinkled; at the basal corners a triangular, black spot and also one at the tip. The disk of the corium has a few dark speckles, formed by the more or less confluent punctures. The membrane brownish and sprinkled with some large, black dots, the base darker. The connexivum is edged with white and black lines and has on the incisures broad, whitish, transverse bands. Abdomen much rounded, luteous, on the sides of the segments a few black spots; also one or two near the base of the coxæ. Feet yellowish white and dotted with large, black spots.

The genital segment of the ♂ is quite remarkable: it is a little longer than broad, with a transverse, shallow line before the middle, the base convexly rounded and sloping abruptly towards the apex, which is truncate, very feebly indented in the middle, with the corners decidedly hump-like in form.

Length, ♀ 15 mm., ♂ 12 mm.; width across the thorax, ♀ 6 mm., ♂ 5 mm.

Four specimens, ♂♂ and ♀♀, Washington, D. C., September 6, 1903; Glen Echo, Md., July 10, August 25, 1893 (Heidemann).

Type.—No. 8217, U. S. National Museum.

This species very much resembles *A. armigera* Say in form and colors, but can easily be distinguished by the absence of the spines on the head and by the differently-shaped ♂ genitalia. It differs from the common squash bug (*A. tristis* De Geer) in having a comparatively shorter and broader thorax and in lacking the stripes on the head. The species is referred to by Dr. F. H. Chittenden, in an article on the life history of the horned squash bug, published in Bulletin 19, new series, U. S. Department of Agriculture, p. 30, 1899.

—Mr. Caudell said that he had just returned from Cambridge, Mass., where he spent several weeks in the study of Scudder's types of North American Orthoptera in the Museum of Comparative Zoology. He stated that the Scudder collection is now well cared for by the curator of the Museum, Mr. Samuel Henshaw, although it is obvious that during the prolonged illness of Dr. Scudder it had suffered from neglect. With the exception of those groups lately revised by Scudder, the collection is not as well arranged as might have been expected. Mr. Caudell mentioned short visits he had made, before his return to Washington, to museums in New York, Brooklyn, and Philadelphia. At Wellesley, Mass., also, he had visited Dr. A. P. Morse, and had had the opportunity of examining his collection of Acrididæ—undoubtedly one of the finest collections in this family in the United States.

—Mr. Benton reported that he had seen a comb of the giant honey bee (either *Megapis dorsata* or *M. zonata*) in the Philippine exhibit at the World's Fair, St. Louis, Mo. It was attached to the under side of the limb of a tree and measured about $1\frac{1}{2}$ feet in width by some 3 feet in length. There were $4\frac{1}{2}$ cells to the linear inch, or 20 to the square inch, while the thickness of the comb where brood had been reared was 1 7-16 inches. Mr. Benton stated that the workers of the giant bees are about as large as queens of *Apis mellifera*.

—Mr. Banks showed a collection of several species of Hymenoptera whose sleeping habits he had observed. During last summer he discovered a colony at Falls Church, Virginia, about a mile distant from the one found by him two years ago.¹ The

¹ Sleeping Habits of Certain Hymenoptera. By Nathan Banks. Journ. N. Y. Ent. Soc., x, No. 4, pp. 209-214, December, 1902.

colony, or sleeping place, was tenanted by some eight or ten different species. Although he noticed a few ♀ ♀, most of the specimens observed were ♂ ♂. Small bees were found in closed blossoms of the lace flower, or wild carrot (*Daucus carota*), while bumble bees rested under the edges of certain flowers. Wasps belonging to the genus *Ammophila* held on to grass stems by their mandibles, the body extended straight and wings closely folded. Some other species use their mandibles in the same way, but *Ammophila* is the only insect which, in some cases, uses its mandibles exclusively for this purpose, the legs not touching the stem.

—Mr. Banks referred to his recent visit to the Museum of Comparative Zoology at Cambridge, Mass., where he made an examination of Hagen's collection of Neuropteroid insects and Emerton's collection of spiders. Some of Keyserling's types of spiders, also, are deposited in the Museum. He stated that Hagen's collection has not been rearranged but is kept intact just as Hagen left it. This Mr. Banks considered most commendable and a policy which should be more generally followed.

—Mr. Caudell mentioned instances which have come under his observation of the mating of different species of *Melanoplus*, *Schistocerca*, and other Orthoptera. The Morse collection of Acrididæ, he stated, contains a fine series of intergrades. The subject of hybridization was discussed by Messrs. Piper and Gill, the latter stating that so-called new genera in fishes have been based upon hybrids between different genera.

—Dr. Dyar read the following paper:

OUR PRESENT KNOWLEDGE OF NORTH AMERICAN
CORETHRID LARVÆ.

BY HARRISON G. DYAR.

Having discussed, in conversation with Mr. Coquillett, the relationships of the Diptera allied to the Culicidæ, it seemed to us a more natural arrangement to separate the true mosquitoes into a distinct family on the character of the presence of the proboscis, and remove the non-biting forms, the old Corethrinæ, placing them with the Dixidæ as a second family, under the name Corethridæ. In the larvæ of this group the mouth brushes are somewhat developed, and in other characters they approach the true mosquitoes.

Dixa is the most generalized form and is a surface feeder, taking small vegetable particles by the rapid motion of its mouth parts. The air tube is well developed, but sessile, and there are false abdominal feet to assist the larva in ascending the water film at the margin, as is its habit. From *Dixa* can be derived not only all the other Corethridæ, but the Culicidæ as well. *Anopheles*, for example, is very close to *Dixa* in many characters.

Except *Dixa*, all the Corethridæ are predaceous, feeding largely on the larvæ of the true mosquitoes. Next to *Dixa* comes *Eucorethra*, with its air tube still sessile, but the mouth parts modified for its predaceous habits. It is still nearly a surface feeder, lying flatly in the water. *Corethrella* is a fur-

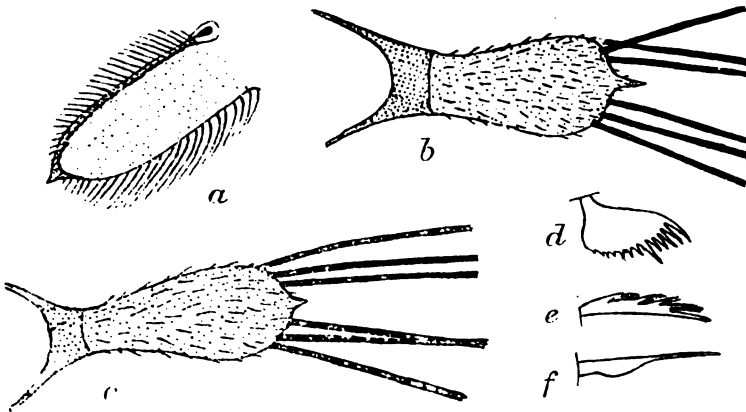


FIG. 2.—Structural details of North American Corethrid larvæ: *a*, ciliated plate of air tube in *Dixa recens*; *b*, anal segment of *Dixa recens*; *c*, the same of *D. centralis*; *d*, leaf-like appendage of *Sayomyia americana*; *e*, the same of *S. trivittata*; *f*, the same of *S. knabi*

ther specialization of this type, the air tube having become elongated, allowing the larva to sink lower in the water, while the peculiar rapacious antennæ are remarkably adapted.

Corethra shows a development in a different direction. The air tube is elongated, but apparently could not be adapted to the requirements of the larva, as it became necessary for it to sink deeper and deeper in the water, so it has begun to be disused. The horizontal position is still maintained by the formation of air bladders, one pair in the thorax, a second near the end of the abdomen. These are enlargements of the tracheal tubes and are joined by them to the air tube. It would seem that this fortunate arrangement supplied the larva with air-reservoirs, so that it is able to stay long below the surface and frequent the depths where it finds its subsistence.

Sayomyia has accomplished a still further specialization along these lines. It has dispensed with the air tube entirely and the trunks of the tracheal tubes as well, while it floats like a transparent ghost deep in the pool, carrying its four sacs of air which are now never connected with the air above. We suppose that the air in these sacs is replenished by diffusion through the body walls from the air dissolved in the water; but the character appears to us as a very remarkable one which would not have been antecedently thought possible.

The Corethridæ, as here limited, include 23 species described from North America. Of these we know the larvæ of 15 more or less completely. There are no unknown genera, and it is probable that the unknown species of *Dixa* and *Sayomyia* are similar to the known ones. Indeed some of the species of *Dixa* may be synonymous; but on the other hand, there are probably a number of forms to be discovered. The subject has been very little worked.

The following synoptic table will separate the known larvæ:

1. Air tube present.....	2
Air tube absent, larvæ aquatic.....	7
2. Air tube sessile, larvæ at surface of water.....	3
Air tube elongate, larvæ below surface of water.....	6
3. Abdomen with false feet; antennæ not longer than other mouth parts	4
Abdomen without false feet; antennæ long and directed forward	
	<i>Eucorethra underwoodi</i>
4. Ciliated plates of the air tube without a projecting triangular hairless apex.....	<i>Dixa clavula</i> ¹
These plates with such an apex (fig. 2, a).....	5
5. Anal segment finely haired, the hairs shorter than the stout terminal cone (fig. 2, b).....	<i>Dixa recens</i>
Anal segment coarsely haired, the hairs longer than the small terminal cone (fig. 2, c).....	<i>Dixa centralis</i>
6. Antennæ moving in a horizontal plane; larvæ flattened dorso-ventrally.....	<i>Corethrella brakeleyi</i>
Antennæ moving in a vertical plane; larvæ subcylindrical,	
	{ <i>Corethra cinctipes</i> ²
	{ <i>Corethra lintneri</i>
	{ <i>Corethra velutina</i>
	{ <i>Corethra karnerensis</i>

¹ = *modesta* Joh. According to Mr. Johannsen's figure (Bull. 68, N. Y. State Mus., pl. 48, figs. 5 and 7, 1903). I have not myself seen the larva. The projecting apex belongs to the outer sheath of the plate and it may not be shown in Johannsen's figure.

² I am unable to distinguish *Corethra cinctipes* Coq. and *C. velutina* Ruthe. The latter may not be the European form, but *C. karnerensis* Felt or *C. lintneri* Felt, which I am likewise unable to distinguish.

comprises 132 specimens, representing 16 species. In addition there are five specimens from Vancouver Island collected by Dr. Dyar, representing four species not included in those from the Kootenay country, namely, *Lestes congener*, *Æschna contracta*, *Sympetrum costiferum* and *S. vicinum*.

While at Banff, Alberta, the writer took an undetermined ♀ of *Æschna*; and Mr. N. B. Sanson, Curator of the Park Museum at Banff, subsequently sent him for determination three specimens of *Sympetrum scoticum*, a species which in all probability occurs in portions of British Columbia.

The most abundant species in the Kootenay District appear to be *Lestes forcipatus*, *Enallagma cyathigerum*, *Cordulia shurtleffi*, *Leucorhinia proxima*, *Sympetrum corruptum* and *Libellula quadrimaculata*.

The writer is indebted to Dr. Philip P. Calvert for kind assistance in naming some of the species of *Sympetrum* and for verifying the determinations of *Leucorhinia*.

[***Lestes congener* Hagen.**

We did not find this species in the Kootenay District, but Dr. Dyar collected a single ♂ at Wellington, on Vancouver Island, September 2.]

***Lestes uncatus* Kirby.**

Kaslo, August 5 (1 ♂, 1 ♀), August 7 (1 ♀).

***Lestes forcipatus* Rambur.**

Kaslo, July 9 (3 ♂♂, 6 ♀♀)—all somewhat teneral; Mirror Lake, Kaslo, August 6 (1 ♀).

One of the ♂♂ is remarkable for its extremely short abdomen—measuring only 20.5 mm., the same length as the hind wing.

***Enallagma cyathigerum* Charpentier.**

"Lilypad Lake," Kaslo, June 7 (Dyar: 2 ♂♂, teneral); June 10 (5 ♂♂, 2 of them teneral), June 26 (2 ♂♂), July 2 (3 ♂♂, 2 of them teneral), July 9 (5 ♂♂); Mirror Lake, Kaslo, August 6 (3 ♂♂, 1 pair *in coitu*); Loon Lake, Ainsworth, July 11 (1 ♂); Bear Lake, July 20 (5 ♂♂).

***Enallagma* sp.**

"Lilypad Lake," Kaslo, May 29 (Dyar: 1 ♀); Mirror Lake, Kaslo, July 7 (1 ♀), August 6 (2 ♀♀); Loon Lake, Ainsworth, July 11 (1 ♀).

These specimens belong either to *cyathigerum* or *calverti*, but as no character for separating the two of these two species has yet been discovered they cannot now be determined specifically.

Enallagma calverti Morse.

Mirror Lake, Kaslo, August 6 (3 ♂♂); Loon Lake, Ainsworth, July 11 (1 ♂, 1 pair *in coitu*).

Enallagma carunculatum Morse.

Mirror Lake, Kaslo, July 17 (1 ♀), August 6 (6 ♂♂, 1 pair *in coitu*, 1 ♀).

Ischnura cervula Selys.

Mirror Lake, Kaslo, July 17 (1 ♂), August 6 (1 ♂).

Æschna juncea (Linnaeus).

Kaslo, August 7 (1 ♂).

Æschna multicolor Hagen.

Loon Lake, Ainsworth, July 11 (2 ♂♂).

[Æschna constricta Say.

Not taken in the Kootenay District, but Dr. Dyar collected two ♂ specimens on Vancouver Island—one at Shawnigan Lake, August 31, and the other at Wellington, September 2.]

Æschna spp.

"Lilypad Lake," Kaslo, July 8 (1 ♀); Bear Lake, July 21 (1 ♀); South Fork Creek, August 11 (1 ♀).

Also a ♀ from Banff, Alberta, collected on August 16.

Somatochlora semicircularis (Selys).

Loon Lake, Ainsworth, July 11 (1 ♂); Bear Lake, July 20 (1 ♀).

The triangle is crossed in the left hind wing of the ♂ and in both hind wings of the ♀. The triangles are crossed in the fore wings of both specimens, but there is in the U. S. National Museum a specimen collected by the writer on the Snake River, Yellowstone National Park, August 14, 1896, in which the triangles of both fore wings are free, although the cross-vein is indicated at either end in the right wing.

Cordulia shurtleffi Scudder.

"Lilypad Lake," Kaslo, May 29 (Dyar: 1 ♂), June 7 (Dyar: 1 ♀), June 10 (3 ♂♂); Loon Lake, Ainsworth, July 11 (17 ♂♂).

Five of these specimens show irregularities in venation, as follows: The single ♀ has a *second* cubito-anal cross-vein in the right hind wing; while of the other specimens—♂♂, all from Loon Lake—one has a second cubito-anal cross-vein in the *right* hind wing; one has this vein, interrupted in the middle, in the *left* hind wing; one has this vein in *both* hind wings; while the fourth specimen has *no* cubito-anal cross-vein in *either* hind

wing, although the first cross vein is indicated at the upper and lower extremities of the median space.

***Leucorhinia hudsonica* (Selys).**

"Lilypad Lake," Kaslo, June 7 (Dyar: 1 ♀); Fletcher's Ranch, Kaslo, 2,800 feet alt., June 11 (1 ♂); Ainsworth, June 8 (Dyar: 1 ♂, 1 ♀).

The triangle of fore wings is crossed in all four of our specimens. The postcubitals vary from 7 to 10. The internal triangle, in the ♂ collected on June 11, is 3-celled in right fore wing, partially crossed by a single vein in the left fore wing; in the ♂ from Ainsworth the internal triangles are 2-celled in both fore wings; in the ♀ collected on June 7 the internal triangle in right fore wing is 3-celled, in left fore wing open, the triangle of left hind wing is crossed and there is one supratrangular on the right hind wing; in the ♀ from Ainsworth the internal triangle is 2-celled in left fore wing, free in right fore wing.

***Leucorhinia proxima* Calvert.**

"Lilypad Lake," Kaslo, June 1 (Dyar: 1 teneral ♂), June 10 (1 ♂); Kaslo, June 12, found dead on hotel window (1 ♂), June 26 (1 ♂), July 2 (1 ♀), July 9 (1 ♂).

The specimen collected on June 1 has the wings subfumose.

***Sympetrum corruptum* (Hagen).**

Kaslo, June 7 (Dyar: 1 ♀), June 13 (1 ♀), June 18 (3 ♂♂), June 19 (2 ♂♂, 2 ♀♀), June 23 (1 ♀), June 26 (2 ♂♂, 1 ♀), June 28 (1 ♂), June 29 (3 ♂♂), July 2 (4 ♀♀); Fletcher's Ranch, Kaslo, 2,800 feet, June 11 (1 ♂); Loon Lake, Ainsworth, July 11 (1 ♂).

***Sympetrum madidum* (Hagen).**

Kaslo, August 5 (1 ♀).

The single specimen seems to be referable to this species rather than to any other of the described North American species of *Sympetrum*.

***Sympetrum obtrusum* (Hagen).**

Kaslo, August 7 (2 ♀♀).

The writer had determined these specimens, from the description, as Hagen's *decisum*; but Dr. Calvert has since informed him that some years ago, from a study of Hagen's types of that species, he reached the conclusion that *decisum* is a synonym of *obtrusum*.

[*Sympetrum vicinum* (Hagen).

Wellington, September 2 (Dyar: 1 ♂).]

Sympetrum semicinctum (Say).

Kaslo, August 6 (1 ♀), August 7 (1 ♂).

[Sympetrum costiferum (Uhler).]

Wellington, September 2 (Dyar: 1 ♀).]

[Sympetrum scoticum (Donovan).

Banff, Alberta (N. B. Sanson: 1 teneral ♂, 1 adult ♂, 1 ♀).]

Libellula quadrimaculata Linnæus.

Kaslo, May 29 (Dyar: 1 ♀), June 9 (1 ♂), June 11, Mirror Lake, 1,670 feet, and Fletcher's Ranch, 2,800 feet (21 ♂♂, 5 ♀♀, 2 pairs *in coitu*), June 14 (2 ♂♂), June 16 (1 ♀), June 18 (1 ♂, 1 ♀), July 2 (1 ♂).

—The concluding paper was by Mr. Banks, and entitled:

ARACHNIDS FROM COCOS ISLAND.

BY NATHAN BANKS.

Cocos Island, situated in the Pacific Ocean some distance off the west coast of Mexico, has been rarely visited by naturalists. The only spider previously recorded from the island is *Argyropeira nigriventris* Keys., which was taken by the Hopkins-Stanford Galapagos Expedition. A few years ago Dr. Paul Biolley of San José, Costa Rica, visited the island, and several papers have been published on the results of his trip. The Arachnida were sent to me for examination, and although few contain one or two interesting things. The most important is a Phalangid representing a new genus. There were eight species in the collection, six spiders, and two Phalangids. The types are in the collection of the writer.

ARANEIDA.**Gasteracantha hexacantha** Fabricius.

Several specimens of the usual type. This is a widely distributed species in the tropics.

Gasteracantha biolleyi, new species.

Cephalothorax black; legs and sternum black; abdomen yellow, with black spines and marks; a band connecting the larger lateral spines, an oblong spot near base of anterior spines, and a crescent each side in front; from the black band there is a mark extending to the posterior spines; all the sigillæ are on these black marks. The venter is black, with many small yellowish spots. In shape it is much like *G. cancriformis*,

but the posterior lateral spines are larger and more recurved than in that species.

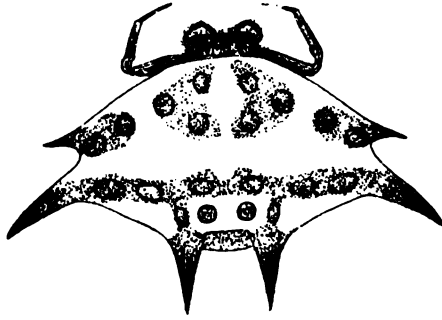


FIG. 3.—*Gasteracantha biolleyi*.

Two specimens from Cocos Island collected by Dr. Paul Biolley.

***Leucauge argyra* Walckenær.**

A few specimens of this common tropical spider.

***Leucauge nigriventris* Keyserling.**

Taken by the Hopkins-Stanford Galapagos Expedition. It occurs also in northern South America and in the Galapagos Islands.

***Theridium* species.**

A few specimens of a small species, with a short yellow abdomen and a black cephalothorax. Quite possibly it is new.

***Ctenus* species.**

One immature specimen.

***Lycosa* species.**

Several young specimens.

PHALANGIDA.

***Pellobunus*, new genus.**

Near *Sterrhosoma* Thorell, but separated therefrom by the slender legs, with fewer tarsal joints, and fewer spines on tibia of palpus, and by absence of claw to tarsus I.

Type: the following species:

Pellobunus insularis, new species.

Body and mandibles reddish; palpi and legs yellowish; the latter banded with black on patellæ, tibiæ, and metatarsi; one at apex of femur, one at apex of patella, three on tibia (one at base, one beyond middle, and one at the tip), two on metatarsus (one near base, and one near the tip); sometimes, also, bands on tarsi. Two ocelli separated by a broad, rounded tubercle; mandibles large, but not greatly swollen. Legs all slender, with

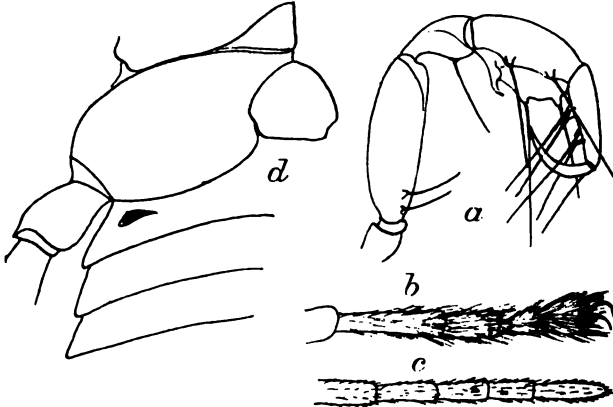


FIG. 4.—*Pellobunus insularis*: *a*, palpus; *b*, tarsus III; *c*, tarsus I; *d*, coxa IV and base of abdomen.

rows of short bristles; no claw to leg I; tarsus I with 5 joints; II with 6 joints; III and IV with 4 joints each. Palpus rather slender, two spines, or rather tubercles tipped with bristles, on each lower edge, and a hook at base on outer edge; two similar bristles on each lower edge of metatarsus, the apical claw nearly as long as last joint. Abdomen with last four segments free; the dorsum with many transverse rows of short curved bristles; similar bristles on the venter. Length 3 mm.

One specimen from Cocos Island, collected by Dr. Paul Biolley.

Cynorta insularis, new species.

Body rich red-brown, a yellow spot each side over coxæ II, four pairs of small spots in diverging rows from eyes to posterior margin of dorsal shield, and a larger yellowish spot at each outer apical corner of dorsal shield; legs and palpi yellowish. Basal joint of mandibles roughened above, and tuberculate on outer sides; eye-tubercle broad, low, and smooth; two erect, acute, submedian spines behind on the edge of dorsal shield; dorsal seg-

ments with a transverse row of granules on middle, ventral segments with row near posterior margin; coxæ strongly and evenly granulate; legs with rows of minute, erect bristles; tarsus I of 6 joints, the basal twice as long

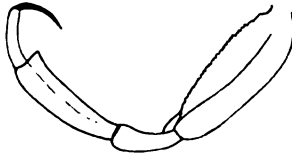


FIG. 5.—Palpus of *Cynorta insularis*.

as others; tarsus II of 13 joints, the basal scarcely as long as next two together; tarsus III of 6 joints, basal as long as next two together; tarsus IV of 9 joints, basal nearly as long as next three together. Length 4.5 mm.

Two specimens from Cocos Island, collected by Dr. Paul Biolley. This species is related to *C. quadripustulata*, but without the large spots, of smaller size, etc.

DECEMBER 1, 1904.

The 191st regular meeting was held at the residence of Mr. Otto Heidemann, 700 Newark street, N.W., Vice-President Hopkins in the chair, and Messrs. Ashmead, Barber, Benton, Burke, Currie, Dyar, Heidemann, Morris, Piper, Quaintance, Schwarz, Scott, and Titus, members, and Messrs. Couden, Girault and Strauss, visitors, present.

The following new members were elected: Corresponding members, Dr. W. E. Britton, Entomologist of the Connecticut Agricultural Experiment Station, New Haven, Ct., and Messrs. W. J. Phillips and G. I. Reeves, of Urbana, Ill. Active members, Messrs. F. D. Couden and A. A. Girault, of the Bureau of Entomology, U. S. Department of Agriculture.

Officers for the year 1905 were elected as follows: President, Mr. Nathan Banks; First Vice-President, Dr. A. D. Hopkins; Second Vice-President, Mr. Otto Heidemann; Recording Secretary, Mr. Rolla P. Currie; Corresponding Secretary, Mr. Frank Benton; Treasurer, Mr. J. D. Patten; additional members of the Executive Committee: Dr. H. G. Dyar, Dr. L. O. Howard and Mr. C. L. Marlatt.

—Mr. Schwarz exhibited specimens of a Ptinid beetle (*Nip-tus hololeucus* Faldermann) received from Prof. James Fletcher, Entomologist of the Canadian Government, who reported that it was a great nuisance in houses in Montreal. He stated that some years ago¹ he had published the prediction that the importation into America of this omnivorous beetle was only a question of time. He reviewed the literature on the beetle in reference to its distribution and economic importance.

—Dr. Ashmead announced that the National Museum had received from Father Robert Brown of Manila some Philippine fig-insects (Agaonidæ)—the first fig-insects to be recorded from the Philippine Islands. They fall in the Australian genus *Kradibia*. With them were specimens of the inquiline or parasitic Idarnines belonging to the genus *Sycoryctes*, first described from Java.

—Dr. Ashmead stated, further, that in a collection of insects from Mr. Charles S. Banks, the Entomologist of the Philippines, were specimens of Hymenoptera belonging to *Oxybelus* and *Prosopis*—two genera not before on record from the Philippine Islands. Another addition to the list of Philippine Hymenoptera from the same source is the nearly cosmopolitan ant *Solenopsis geminata* Fabr.

—Dr. Hopkins exhibited a branch of juniper from Vermijo, New Mexico, showing the work of a new Scolytid beetle belonging to the genus *Phlaosinus*. The tree, from which the branch was cut on May 6, 1903, was felled during the summer of 1902. Live beetles were noticed on the branch on July 24 of the present year, and now, one year and seven months after the branch was collected, some of the beetles are still alive and running about.

—Mr. Heidemann showed specimens of Hemiptera belonging to the genus *Homalocoris*, and probably representing the Mexican species *guttatus* of Walker, collected at Flagstaff, Arizona, during the past season by Mr. Webb. There are now in the National Museum collection ten specimens from Arizona of this interesting species. The first of these were found by Mr. H. G. Hubbard in the Chiricahua Mountains; later it was collected by Mr.

¹ Can. Ent., xxviii, p. 178, 1896.

Schwarz in the Santa Rita Mountains, and still later by Messrs. Schwarz and Barber at Williams. Lastly it has been found by Mr. Webb, as above stated. Mr. Heidemann added that *Homolocoris* and another genus, *Hammatocerus*, form a distinct subfamily of the Reduviidæ known as the Hammatocerinæ. This is the only species of *Homalocoris* which has been reported north of the Mexican boundary.

—Mr. Barber exhibited an original photograph of a wasp nest from Brownsville, Texas, made by the Vespid *Gaba* (*Nectarina*) *mellifica* Say. He was told by the negro who had possession of the nest that these wasps produce a palatable honey and that it is customary for the Mexicans to secure the nests when small and keep them until of full size, then destroying the wasps and extracting the honey. The nest was similar to those of our common paper-making wasp, *Vespa maculata*, except that in its lower portion the cells were exposed. It was globular in shape and about nine inches in diameter—not of full size, according to the negro, who, after cautiously inserting a knife into it, withdrawing it and examining the blade, asserted that there was yet too little honey contents to make it worth while to open it up. Mr. Barber said he tried to taste the honey, but the amount on the knife blade was so small that he could scarcely detect any flavor. Thomas Say,¹ in the paragraph following his original description, says of this species that near Jalapa, Mexico, his attention was attracted by a group of Indians eating honey from a paper nest. He found that the honey had a pleasant taste and inferred from the gestures of the Indians that the nest was obtained from a tree.

Mr. Ashmead remarked that it was of interest, in this connection, to note that another Vespoid wasp (*Celonites abbreviatus* Villers, of the family Masaridæ), coming from Algiers, is said to be a honey-maker. Mr. Benton expressed some doubt as to whether the substance produced by the wasps is real honey, but thought it might consist of brood food accumulated in the cells. Mr. Titus stated that he had received from Trinidad, from Mr. H. D. Chipman, a Vespid from which honey is said to be obtained.

¹ LeConte's Edition, Vol. II, p. 769.

—Mr. Schwarz reported that on his recent visit to Texas he learned that the sweet-potato beetle (*Cylas formicarius* Fabricius) had been found in great numbers along the coast of Texas. This beetle came originally from Madagascar and has become introduced into tropical and subtropical portions of the western hemisphere. For some time past it has been known from Florida and Louisiana, but its discovery in Texas indicates that it is now to be found throughout the Gulf region from Florida to Texas and Mexico. Mr. Schwarz stated that he had found it particularly abundant in Cuba, but not so injurious there as elsewhere, since the common variety of sweet potato in that country has run wild and is a troublesome weed, the luxuriant vines overgrowing everything. The beetle is known to Cubans by the name "Tetuan," tradition having it that it first invaded Cuba in the same month and the same year when the famous battle of Tetuan was fought by the Spanish army against the Sultan of Morocco, February 4, 1860.

Mr. Currie said that he had found another species of the genus very destructive to sweet potatoes in Liberia, West Africa, and Mr. Schwarz added that the Liberian species is probably *Cylas turcipennis* Boheman, originally described from Java. He said that there are about ten species known in the genus, all of them coming originally from tropical Africa or the Malay Archipelago.

—Dr. Hopkins stated that while investigating insect damage to hickory trees at Clark's Station, Missouri, on July 10, 1904, he found seven or eight small larvæ attached to a Cerambycid larva (*Neoclytus luscus*) in the sapwood of a hickory tree killed by *Scolytus 4-spinosus*. The larvæ were decidedly parasitic, and were supposed at the time to be braconid, but when (on July 20) they had completed the destruction of their host, and formed peculiar flattened cocoons, he recognized the cocoons as those of a beetle which he had often observed in the larval mines and pupal cases of Cerambycid larvæ, and while at the West Virginia Station he had bred an adult. As near as he could remember, the bred beetle is a Colydiid, probably identical with *Bothrideres contractus*. He says that there is no question regarding this larva being a true external parasite, as much so, indeed, as a braconid. A microscopic examination of the

cocoons shows that the ventral portion by which it is attached is composed of silk-like threads woven in a similar manner to that of hymenopterous cocoons. The dorsal covering is less silk-like, and quite brittle. Mr. Schwarz remarked that a species of *Bothrideres* has been recorded by Mr. Coquerel, in one of the earlier volumes of the *Ann. Soc. Ent. de France*, as a parasite of a Cerambycid larva; and that another species, *Bothrideres cactophagi* Schwarz, had been recorded by Mr. H. G. Hubbard (in *Psyche*, vol. VIII, Suppl. I) as a parasite of the larva of a large Calandrid beetle, *Cactophagus validus* Lec.

—Mr. Benton read the following communication by Mr. G. W. Kirkaldy, extracted from a letter addressed to him as Corresponding Secretary of the Society:

THE HISTORICAL METHOD IN TYPE-FIXATION.

By G. W. KIRKALDY.

In the discussion on "Type-fixation" in a recent number of the Proceedings of this Society no mention is made of the "Historical" method, and as the writer has noticed that this method has been quite ignored in several recent discussions, for example, in the "*Zoologischer Anzeiger*," he will briefly outline it.

By this method—which has been adopted in the writer's forthcoming "List of the Genera of the Hemiptera," and which is also adopted by Mr. Prout, the well known English lepidopterist, who is patiently investigating the nomenclature of the Geometræ—each genus is treated absolutely independently; each is taken separately and the various applications of later authors, their restrictions and type fixations, considered without reference to other genera at all.

Take, for example, the genera *Neides* and *Berytus*. *Neides* Latreille was erected in 1802, for two species, *tipularius* and *clavipes*; a year later, Fabricius founded *Berytus* with *tipularius* specified as type. In this case the "Eliminators" would probably admit two genera, as follows:

1. *Berytus*, with *tipularius*, and—
2. *Neides*, with the species remaining, viz., *clavipes*; and this is in fact the view taken by Lethierry and Severin.

The "historical" method would be as follows:

1. *Berytus*, 1803, type *tipularius*, 1803;
2. *Neides*, 1802, no type till 1804, when *tipularius* was fixed.

In the writer's papers on the bibliography of the genera of the Hemiptera in "The Entomologist"¹ he considered that *Berytus* and *Neides* were strictly homotypical and that *clavipes* required a new generic name; as follows:

1. *Neides* Latreille, 1802, type *tipularius*, 1804;

Berytus Fabricius, 1803, type *tipularius*, 1803;

2. *Berytinus* Kirkaldy, 1900, type *clavipes*, 1900.

There is, in the opinion of the writer, no doubt that in 1802 to 1804 only one genus would be recognized for these two forms, and indeed Latreille in 1804 so considered it. *Clavipes* was not, he believes, treated as generically distinct till about 25 years later when the same author (Schilling) used *Berytus* for the one and *Neides* for the other.

With rule No. 1 of Rothschild and Jordan, the writer cordially agrees and indeed has acted upon the principle from the commencement of his studies. But No. 2 will, he hopes, not be recognized at all. It is at least contrary to the usual procedure of monographers of to-day. It must be noted, however, that certain of the older authors held to this rule; for example, Westwood, in 1839,² writes:

"The reader will observe that I do not here insist upon the necessity of placing a typical species at the head of the genus, because even our imperfect views of nature will enable us to see that such species ought often more naturally to be placed in company with others not arranged at the head of the genus, but I do insist that, where an author does not state the particular species which he regards as the type of his genus, we are bound to suppose that he would place it at the head of his genus."

Though this statement in no way affects the types of other authors, the writer believes that in all Westwoodian genera dating from 1839, the first species must be taken as the type, if this be not otherwise specified.

The paper evoked discussion from Messrs. Ashmead, Morris, Dyar, Piper and Schwarz, Dr. Dyar favoring the method which accepts the first species as type, while the others believed the method of elimination, although leading to unsatisfactory results in certain cases, yet the one which is now most generally

¹ Vol. xxxiii, pp. 238-243, 1900; Vol. xxxvii, pp. 254-258, 1904.

² Mag. Nat. Hist., 1 (2), p. 170. I was previously aware of this in a paper of Westwood's dated 1841, but for the date 1839, I am indebted to Mr. Prout.

followed and the only one which does justice to the authors of subsequently-erected genera.

—The following paper by Dr. Dyar was read by title:

NEW NORTH AMERICAN LEPIDOPTERA AND SYNONYMICAL NOTES.

BY HARRISON G. DYAR.

The following paper is in large part the result of a study of a collection of some 1,500 specimens of Phycitinæ which Mr. W. D. Kearfott has placed at my disposal.

Family NOCTUIDÆ.

***Tæniocampa terminatissima* Dyar.**

This species¹ proves to be synonymous with *Trichorthosia parallela* Grote, as Mr. Jacob Doll has kindly pointed out to me. The species is included in Hampson's fourth volume of the Catalogue of Lepidoptera Phalaenæ, but the genus is not in the table. The spined hind tibiæ and hairy eyes make the form characteristic.

Family GEOMETRIDÆ.

***Tephroclystia harlequinaria*, new species.**

Fore wings light stone-gray with patches of light ochereous. The largest patch occupies the space between veins 3 and 4, overspreading these veins a little and running to the fringe; there is a small patch at the extreme base of wing, a diffuse, indistinctly doubled one on costa at t.-p. line and a small one on vein 6 to outer margin. Lines blackish, waved, scarcely cutting the ochereous shades, marked by little black dashes on the median vein and on all the veins in the t.-p. line, which is regularly and evenly bent outward. Subterminal line fine, white, scarcely enlarged above anal angle. Discal spot black. Hind wings whitish on costal half, the lines distinct near inner margin. A whitish patch at base of abdomen dorsally. Expanse 21 mm.

Two specimens, Victoria, B. C. (E. M. Anderson), Seattle, Wash. (O. B. Johnson); one of the types is in the Provincial Museum at Victoria.

Type.—No. 8176, U. S. National Museum.

Family PYRALIDÆ.

Subfamily GALLERINÆ.

***Cacotherapia nigrocinereella* Hulst.**

In the ♀ the palpi are very long, three times as long as the head, porrect and thickly scaled; in the ♂ they are extremely

¹ Proc. Ent. Soc. Wash., vi, p. 104, 1904.

short, not exceeding the front. I had a ♂ before me in describing the genus, but did not mention this character, supposing the male to be defective. However, I have now a second specimen from Burnet Co., Texas (F. G. Schaupp) showing the same character, as well as two males and five females of the following species:

Cacotherapia flexilinealis, new species.

Yellowish cinereous, sordid, with a powdering of black scales on the inner part of basal and median spaces. Inner line far outward, slender, linear, black, forming a small but marked outward loop on subcostal and median veins and a short re-entrant angle in the cell. A black discal dot or streak on the cross vein and a more or less distinct one in the center of the cell. Outer line similar to the inner one, incurved on both folds; a terminal black line. Hind wings sordid gray or blackish. Expanse 10-17 mm., very variable in size.

Seven specimens, Brownsville, Texas, May 2, Los Borregos, Texas, May 5 (H. S. Barber), Burnet Co., Texas, March and April (F. G. Schaupp); two of the types are with Mr. W. D. Kearfott.

Type.—No. 8198, U. S. National Museum.

I presume the larva of this species will be found to feed on scale insects as the preceding species does.

Subfamily EPIPASCHINÆ.

Cacozelia alboplagialis, new species.

Antennal process long and heavy, curved, reaching to the middle of the thorax. Maxillary palpi pencil-tufted; hind tibiæ with one pair of spurs. Fore wings brown-black, shining, a little more brownish toward anal angle; a large white spot on costa, occupying the middle field, including the black discal dots and some shaded marks along the costal edge. Ordinary lines lightly indicated, approximate below; a black dot in middle of basal space. Base of wing narrowly ochraceous. Hind wing yellowish, subpellucid toward base; traces of an outer black line; outer border brownish; a black line at base of fringe. Expanse 27 mm.

One ♂, Huachuca Mts., Arizona (R. E. Kunzé).

Type.—No. 8194, U. S. National Museum.

Tetralopha melanogrammos Zeller.

Tetralopha melanogrammos Zeller, Verh. zool.-bot. Ges. Wien, xxii, p. 546, 1872.

Katona euphemella Hulst, Ent. Amer., iv, p. 113, 1888.

Wanda tiltella Hulst, Ent. Amer., iv, p. 114, 1888.

Benta speciosella Hulst, Journ. N. Y. Ent. Soc., viii, p. 222, 1901.

Tetralopha euphemella Hulst, Bull. 52, U. S. Nat. Mus., No. 4662, 1903.

Wanda tiltella Hulst, Bull. 52, U. S. Nat. Mus., No. 4665, 1903.

I cannot see more than one species in all this. I have a long series of specimens from Texas and Arizona. The venation is variable.

***Tetralopha humerella* Ragonot.**

Tetralopha humerella Ragonot, Bull. Soc. Ent. France, p. cli, 1888.

Pococera humerella Hampson, Trans. Ent. Soc. Lond., p. 458, 1896.

Tetralopha formosella Hulst, Can. Ent., xxxii, p. 169, 1900.

Dr. Hulst gave me this synonymy and it should have been incorporated in Bulletin 52 of the U. S. National Museum. The larva feeds in the pods of *Gleditschia triacanthos*; U. S. Dept. Agriculture, Bureau of Entomology, Nos. 455 and 5120.

***Tetralopha militella* Zeller.**

Tetralopha militella Zeller, Isis von Oken, p. 880, 1848.

Lanthaphe asperatella Clemens, Proc. Acad. Nat. Sci. Phila., p. 207, 1860.

Benta expandens Walker, Cat. Brit. Mus., xxvii, p. 112, 1863.

Toriipalpus taleolalis Hulst, Trans. Am. Ent. Soc., xiii, p. 160, 1886.

Tetralopha fuscolotella Ragonot, Bull. Soc. Ent. France, p. cli, 1888.

Tioga aplastella Hulst, Ent. Amer., iv, p. 113, 1888.

In Bulletin 52, U. S. National Museum this species is represented by three specific names in as many genera. The supposed generic differences may be at once discarded, since they are founded on the variable venation. The amount of white shading on the fore wings is likewise very variable, and it is this, I suppose, which has further influenced the continued separation of the forms. Under the specific name *melanogrammos* Zell., Dr. Hulst gives the variety *diluculella* Grt., with *talleolalis* Hulst as a synonym. This is wrong, I believe, as *diluculella* Grt. is *robustella* Zell., the pine feeder, as given by Sir Geo. F. Hampson.¹ But Hampson continues *talleolalis* Hulst as a synonym to *diluculella*, Grt., which is wrong again, as this form should be attached to *militella* Zell. Hulst's type was one ♀ from Colorado, and I would use the name *talleolalis* to designate the western race of *militella*, which is larger, more diffusely marked, the lines shaded and broadened. I have it from Aweine, Manitoba (Criddle), Winnipeg, Manitoba (Hanham), Stockton, Utah (Spalding), and southern Arizona (Poling). The white shadings vary from extensive to absent.

There is another form, a true variety, not a race, which I would designate by the name *clemensalis*, new variety. It has the thorax and base of fore wing shaded with dull ochereous. It was mentioned by Clemens, but not named. The variety occurs occasionally in eastern material. I have three before

¹Trans. Ent. Soc. Lond., p. 457, 1896.

me: Rhinebeck, New York, July 12, 1888 (Dyar), Plummers Island, Md., July 24, 1902 (Busck); the third is an old specimen without label.

Type.—No. 8216, U. S. National Museum.

The following is a list of the species which I would refer to *Tetralopha*, with their synonyms and food plants where known. The genus *Lanthaphe* Clemens may be recognized as distinct from *Tetralopha* on account of the longer antennal process of the ♂. It contains but one species.

1. *militella* Zeller.....*Quercus, Acer, Fagus.*
asperatella Clemens
expandens Walker
aplastella Hulst
a. *clemensalis* Dyar
b. *talleolalis* Hulst
fuscototella Ragonot
2. *subcanalis* Walker.....(unknown)
3. *nephelotella* Hulst.....(unknown)
4. *floridella* Hulst.....*Guilandina bonducella*
5. *baptisiella* Fernald.....*Baptisia tinctoria.*
6. *melanogrammos* Zeller.....*Prosopis juliflora.*
euphemella Hulst.
speciosella Hulst.
tiltella Hulst.
7. *humeralia* Ragonot.....*Gleditschia triacanthos.*
formosella Hulst.
8. *robustella* Zeller.....*Pinus.*
diluculella Grote.
scortealis Led.
9. *slossonii* Hulst.....(unknown).

***Pococera tertiella*, new species.**

♂ antennæ ciliated, without perceptible basal process; maxillary palpi simple, minute; labial palpi slender, upturned, scarcely to vertex, third joint acicular. Grayish white; inner line black, triplicate, oblique, forming a blotch on the costa; a few raised black scales in the lower part of the median space. Outer line slender, dentate, black, excurved opposite cell. A broad subterminal black shade; a row of terminal black dashes. Expanse 19 mm. One ♂, Brownsville, Texas, May 9, 1904 (H. S. Barber).

Type. No. 8195, U. S. National Museum.

Ragonot described in 1888 three species of *Pococera*—*variella*, *melanographella* and *texanella*. In Bulletin 52 of the U. S. National Museum, Dr. Hulst makes the two first synonymous and the third the same as *subcanalis* Walker. This latter synonymy seems incorrect, since Hampson¹ puts *subcanalis*

¹Trans. Ent. Soc. Lond., p. 457, 1896.

in *Tetralopha*, after examining Walker's type. I am inclined to view Ragonot's three names as referring to forms of one species, most appropriately named *variella*. I have five specimens from different parts of Texas which I refer to it.

Attacapa callipeplella Hulst cannot be separated generically from *Pococera*. The species may be recognized by the absence of dentations in the outer line.

Subfamily PHYCITINÆ.

Myelois annuliferella, new species.

Fore wings elongate, narrow, dark gray, a little pale ochraceous shaded along inner margin. Inner line far from base, strongly bent out over cell, regaining the inner margin by a long, obtuse angle, white, narrow, narrowly black edged without, not sharply contrasted. Discal mark a neat oval ringlet. Outer line nearly straight, a little crenulate, not bent. Terminal dots diffused. Hind wings white, grayish at the margin in the ♀. Expanse 19-23 mm., the ♀ the smaller.

Two specimens, ♂ and ♀, Gallinas Cañon, New Mexico (E. J. Oslar), Yuma Co., Arizona (collection of W. D. Kearfott).

Type.—No. 8193, U. S. National Museum.

Myelois caliginoidella, new species.

♂ antennæ simple, broken in the type, but the basal joint and several succeeding ones remain. Labial palpi smooth, upturned to vertex, maxillary palpi scaled. Veins 4 and 5 separate on fore wing, approximate at base on hind wing. Fore wing ashen gray, basal space nearly uniformly light; inner line reddish ochraceous, preceded by a zigzag black line on its lower half, followed by a heavy black shade on costa. Discal dots black, separate. Outer line fine, pale crenulate and incised gently on both folds, enclosed by a black shade that runs from apex to middle of inner margin. A terminal row of dots. Hind wings pale yellowish, fuscous on the costa. Expanse 24 mm.

One ♂, Santa Clara, Cal. (collection of W. D. Kearfott).

Type.—No. 8190, U. S. National Museum.

The specimen bears a label "*Mineola caliginella* Hulst," and it much resembles that species; but it is larger, broader winged and the median shading is differently disposed, besides the differential generic character.

Rhodophæa intransitella, new species.

Stout and robust, the ♂ with a large hair-pencil on the metathorax below the hind wings. Light gray, sparsely dusted with black; a large brownish cloud on the inner margin between the lines, shading to yellowish outwardly. Inner line represented by a black dot on costa and a larger triangular spot on the inner margin, lined by pale without, obsolete centrally. Discal dot single, produced outward by a clouded ray. Outer line slightly

roundedly bent inward at discal fold, black, double, faint below, but at apex its edges indicate an oblique black dash. A row of small terminal dots. Hind wings whitish, subpellucid, gray on the edge. Expanse 17-19 mm.

Nine specimens, Albuquerque, New Mexico (E. J. Osler), Phoenix, Arizona (R. E. Kunzé); four of the types are in Mr. W. D. Kearfott's collection. This species somewhat resembles *Myelois transitella* Walker.

Type.—No. 8182, U. S. National Museum.

***Acrobasis kearfottella*, new species.**

As in *A. caryæ* Grote, but the wings washed with a broad pure white shade from base to costa before apex, leaving a black bar on the center of costa, and partly including the discal dots. The inner line is completely cut through. Head and thorax white in the male, gray in the females. No black patches on the wings below in the ♂.

Four specimens, Cleveland, Ohio (W. D. Kearfott), all labelled "*Myelois zonulella* Rag.," obviously incorrectly; one of the types is in Mr. Kearfott's collection. Food plant, hickory.

Type.—No. 8184, U. S. National Museum.

***Nephopteryx decipientella*, new species.**

♂ antennæ slightly bent at the base with a small, compact tuft of scales. Small, narrow-winged, very obscurely marked. Fore wings all blackish gray except a light space about the black discal dots. Base and terminal space a very little lighter, veins dark, a dark terminal line; no other markings discernible. Hind wings pale grayish. Expanse 15 mm.

One ♂ without locality, labelled "A. J. Weidt collection" and "Collection of W. D. Kearfott." Also with a label "*Mineola amplexella* Rag.," to which species it does bear some resemblance.

Type.—No. 8189, U. S. National Museum.

***Meroptera affictella* Hulst.**

Salebria affictella Hulst, Can. Ent., xxxii, p. 170, 1900.

Meroptera liquidambarella Dyar, Proc. Ent. Soc. Wash., vi, p. 108, 1904.

I am satisfied that I have redescribed Dr. Hulst's species. The differences given to separate the genera *Meroptera* and *Salebria* are inconstant, and it is a source of confusion to keep these genera separate. They should be united.

***Meroptera cviatella*, new species.**

Basal space, costa and inner margin broadly bright reddish brown, the center of the wing beyond the base purplish gray, the veins pale. Inner line a broad black shade, cut by the narrow whitish line, which starts from the inner edge of the band on costa, is twice angled and ends on the outer edge of the band on the inner margin. Discal dots confluent, clouded.

Outer line whitish, diffused, scarcely darker edged within, bent inward rather sharply on both folds. A terminal row of black dashes. Expanse 22-25 mm.

Two specimens, Chicago, Ill. (A. Kwiat). The female was sent me some time ago by Mr. Kwiat for name, the male I have just received through Mr. Kearfott. The species is near to *mirandella* Rag., but much darker in color. I have named it in honor of the discoverer, though I am not sure that he will recognize his name in the Latin form.

Type.—No. 8186, U. S. National Museum.

***Salebria yumaella*, new species.**

Fore wing gray, black coarsely powdered on a white ground, nearly uniform. Lower half of basal space darkened. Inner line somewhat curved S-shaped, black on the upper cusp, white on the lower; discal dots black. Outer line white, doubly black edged, the black increased at apex, bent in on both folds. Terminal dots black, powdery, confluent. Hind wings whitish. Expanse 18 mm.

One ♂, Yuma Co., Arizona (collection of W. D. Kearfott).

Type.—No. 8191, U. S. National Museum.

Allied to *odiosella* Hulst, *bakercella* Dyar and *bifasciella* Hulst. From the latter it is separated by the absence of the lower half of the inner black line; from the two former, by the smaller size and narrower markings.

***Salebria nogalesella*, new species.**

Dark bluish gray, cinereous and blackish scales mixed. Basal space lighter outwardly. Inner line broad, black, divided by a narrow, pale, zigzag line. Discal spots joined. Outer line curved at discal fold, straight and crenulate below, pale, finely black edged within. A terminal row of black dots. Hind wings subpellucid yellowish fuscous, darker on the edge. Expanse 20 mm.

One ♂, Nogales, Arizona (E. J. Osler).

Type.—No. 8192, U. S. National Museum.

This falls near *Meroptera pravella* Grote, but looks so differently that I cannot leave it under that label. The markings are about the same, but the color is brighter gray and more powdery. I have compared also the descriptions of *Meroptera uvinella* Rag., and *Salebria subfuscella* Rag., which are very near to *pravella* if not synonymous therewith; but do not find that they apply to *nogalesella*.

***Megasis aridella*, new species.**

Fore wings nearly white with blackish shadings, faintly ochereous in the terminal space, all the veins lined with black. Inner line broken, showing an angle on vein 1 and a patch on the median vein and on costa; two discal

dots; outer line bent inward on both folds, clouded, gray, white edged without; a row of terminal dots. Hind wing nearly pure white; a gray terminal line and a narrow one in the pale fringe. Expanse 35-37 mm.

Two specimens, ♂♂, Stockton, Utah (T. Spalding); one of the types is with Mr. Kearfott.

Type.—No. 8188, U. S. National Museum.

This is a desert form of *Megasia*, recalling the Asiatic *M. alpherakii* Rag.

Melitara fernaldalis Hulst.

Melitara fernaldalis Hulst, Trans. Am. Ent. Soc., XIII, p. 163, 1886.

Euzophera gigantella Ragonot, Nouv. Gen. et Sp. Phyc. Gall., p. 32, 1888.

Melitara fernaldalis Schwarz, Psyche, VIII, Suppl. 1, p. 13, 1899.

Honora cinerella Hulst, Journ. N. Y. Ent. Soc., VIII, p. 223, 1901.

Euzophera gigantella Dyar, Proc. Ent. Soc. Wash., VI, p. 158, 1904.

This species differs from Hulst's definition of *Melitara* in that the ♀ antennæ are without pectinations. It is also longer and narrower winged than the other species of *Melitara*. This has caused the female to be twice redescribed under other genera, as I have noted. The larva feeds in the giant cactus (*Cereus giganteus*) as described by Mr. Schwarz.

Yosemetia maidella, new species.

♂ with the costa concave, recalling *Pseudoschænobius opalescalis* Hulst, but the maxillary palpi invisible and vein 11 of fore wings free from vein 12. Light ashen gray, ground nearly white, rather thickly dusted with black. An ochereous bar on inner margin at inner line, always faint, sometimes absent, preceded by a group of black scales, followed by a zigzag blackish line which spreads diffusely on the veins without. Subcostal and outer veins black lined. Discal dot double; outer line clouded, streaked, bowed inward at discal fold. Hind wings subpellucid pale grayish. Expanse 25-30 mm.

Twenty-two specimens, Stockton, Utah (T. Spalding); thirteen of the types are in the collection of Mr. W. D. Kearfott.

Type.—No. 8180, U. S. National Museum.

Yosemetia mysiella, new species.

Similar to the preceding, but smaller, the yellow bar more distinct, both lines less angled and narrower; the powdering on the wings is uniform and not streaked on the veins; the costa of the ♂ is not concave. Expanse 23-26 mm.

Sixteen specimens, Stockton, Utah (T. Spalding), Phoenix, Arizona (R. E. Kunz); seven of the types are in the collection of Mr. W. D. Kearfott.

Type.—No. 8181, U. S. National Museum.

Zophodia grossulariæ Riley.

Pempelia grossulariæ Riley, Rept. Ins. Mo., 1, p. 140, 1869.

Dakruma turbatella Grote, Bull. Geol. Surv. Terr., IV, p. 702, 1878.

Euzophera franconiella Hulst, Trans. Am. Ent. Soc., XVII, p. 177, 1890.

Zophodia bella Hulst, Can. Ent., XXIV, p. 61, 1892.

Zophodia grossulariæ Hulst, Bull. 52, U. S. Nat. Mus., No. 4821, 1902.

Zophodia bella Dyar, Proc. Ent. Soc. Wash., VI, p. 228, 1904.

I cannot see any specific difference between Hulst's *bella* and the old *grossulariæ*. The Western form, as I have noted, is distinguishable as a race, being larger, with the markings heavily contrasted. It is unfortunate that the names *turbatella*, *bella* or *franconiella* cannot be used for it; but these were all based on Eastern specimens. I have the Western form from Manitou, Col. (Dyar), Seattle, Wash. (O. B. Johnson), Oregon (Koebele) Kaslo, B. C.¹ (Dyar) and Wellington, B. C. (G. W. Taylor, Th. Bryant).

Zophodia orobanchella Dyar.

I think that this species² will prove to be the same as *packardella* Rag. I have now additional specimens from Phoenix, Arizona (R. E. Kunzé), and while they do not agree with Ragonot's description, his figure strongly suggests them by its wing shape and round discal dot. I suspect that Ragonot's single type may have been in bad condition, so that the lines were not visible.

Zophodia perdubiella, new species.

Palpi porrected, second joint thickened by scales, third slender, deflexed, not long and beak-like. Wings narrow, elongate; form slender. Ashen gray, a few lighter scales along the costa and a trace of darker discal dots; all the marks obsolete. Expanse 22-26 mm.

Two specimens, Stockton, Utah (T. Spalding).

Type.—No. 8187, U. S. National Museum.

A single specimen of *Yosemetia aureomaculella* Dyar from this same locality, very lightly marked and somewhat worn, almost exactly matches these specimens, but is easily distinguishable by the much longer palpi.

Lætilia ephestiella Ragonot.

Dakruma ephestiella Ragonot, Diag. N. Am. Phyc., p. 13, 1887.

Lætilia ephestiella Dyar, Proc. Ent. Soc. Wash., VI, p. 159, 1904.

Maricopa lustrella Dyar, Proc. Ent. Soc. Wash., V, p. 227, 1903.

In my *Maricopa lustrella* the tongue is very small, but not

¹ Incorrectly referred to as *Z. packardella* Rag., Proc. U. S. Nat. Mus., XXVII, p. 921, 1904.

² Proc. Ent. Soc. Wash., VI, p. 111, 1904.

enough so to refer the species to the genus *Maricopa*. When corrected in this respect, it falls in *Lætiha*, and I cannot distinguish it from Ragonot's species, to judge from his description.

***Staudingeria albipennella* Hulst.**

Pempelia albipennella Hulst, Ent. Amer., III, p. 133, 1887.

Staudingeria albipennella Ragonot, Rom. Mém., VIII, p. 136, 1901.

Staudingeria perluteella Dyar, Proc. Ent. Soc. Wash., VI, p. 111, 1904.

Staudingeria olivacella Dyar, Proc. Ent. Soc., Wash., VI, p. 111, 1904.

Mr. Kearfott has put into my hands a long series of this species, which shows that my *perluteella* and *olivacella* are but the extremes of variation of one form. The names may be used to designate the varieties.

***Heterographis morrisonella* Ragonot.**

I have before me a series of 50 specimens of this species, most of them from Mr. Kearfott's collection. I can match Ragonot's figures of *coloradensis* and *morrisonella*, but there is nothing that would fit the form *olbiella* Hulst, which is said to have "all the wing washed with vinous red." Now I have a ♀ specimen identified by Dr. Hulst as *olbiella*, which is entirely washed with vinous red; but it is *Staudingeria albipennella*, not *Heterographis morrisonella*. I am aware that Dr. Hulst's determinations are not generally reliable and that his description of *olbiella* covers ochraceous as well as brown forms; therefore, I would refer *olbiella* as a synonym to *morrisonella*, not as a variety. The name *morrisonella* will stand for the dark form and *coloradensis* for the pale one. The two are not sharply separated, but intergrade.

***Homœosoma oslarellum*, new species.**

Fore wing dark blackish, relieved by a scattering of gray scales on the costal portion, especially at base of costa. Lines wanting, the outer shadowed in gray scales; discal dots black, small, obscure. Hind wing grayish, subpellucid, lighter towards the inner margin; fringe pale. Expanse 17-22 mm.

Eleven specimens, Chimney Gulch, Golden, Colorado (E. J. Oslar); five of the specimens are in Mr. Kearfott's collection.

Type.—No. 8185, U. S. National Museum.

Nearly allied to *H. electellum* Hulst, but much darker and with obsolete lines.

***Homœosoma striatellum*, new species.**

Pale gray, veins all lined with black, lines nearly obsolete. The light gray of the ground color is dusted with blackish; a distinct black line along subcostal and median veins, the veins outwardly more or less distinctly

lined. Inner line blackish, clouded, oblique and with a strong angle on the median vein, varying from distinct to but a trace. Outer line oblique, blackish, clouded, always fainter than the inner line and often hardly traceable. Discal dots indicated by slight enlargements at the ends of the lines on subcostal and median veins. Hind wings whitish, subpellucid, narrowly ashen at the margin. Expanse 18-22 mm.

Twelve specimens, Phœnix, Arizona (R. E. Kunzé), Death Valley, California (A. Koebele); four of the types are in the collection of Mr. W. D. Kearfott.

Type.—No. 8179, U. S. National Museum.

Eurythmia spaldingella, new species.

Narrow winged; gray, black scales on a whitish ground. Inner line whitish, black edged without, produced outward in the cell in a long point. Discal dots small, double. Outer line near the margin, whitish, nearly straight, with a black shade within. A terminal black line. Markings all rather powdery, but distinct. Hind wings pallid, subpellucid. Expanse 14-15 mm.

Four specimens, Stockton, Utah (T. Spalding); two of the types in Mr. Kearfott's collection.

Type.—No. 8183, U. S. National Museum.

This may be *E. coloradella* Hulst which is not before me, but only so on the assumption that Hulst's type has lost the markings.

Barberia, new genus.

Fore wings with nine veins, 5 and 8 absent, 3 and 4 separate, 9 and 10 stalked; hind wings with seven veins, 5 absent, 2 well before the angle of the cell, 3 and 4 stalked, 8 short but distinct. Labial palpi slender, sharply ascending, almost erect, smooth and closely scaled, the third joint nearly as long as the second; maxillary palpi simple; tongue minute; ♂ antennæ simple.

Barberia affinitella, new species.

Fore wings blackish brown with a broad white costal stripe; inner area a little lighter, especially toward base. Expanse 11 mm.

Six specimens, Brownsville, Texas, Los Borregos, June 5, 1904 (H. S. Barber).

Type.—No. 8196, U. S. National Museum.

The venation is possibly variable. If there were 10 veins in the fore wings the species would fall in *Hypsotropa*; but it differs therefrom in the palpi. It closely resembles *Homosassa ella* Hulst in appearance, but the palpi are even more different.

—The following paper by Mr. Banks was read by the Recording Secretary:

AN ALLEGED PARASITIC TYROGLYPHID.

BY NATHAN BANKS.

Tyroglyphids have been found in many situations where one would never expect them, nor easily explain their presence. They have a minute migratory stage which may be attached to various insects, and in this way they may be transported far from their birthplace. It was one of these mites that an Eng-

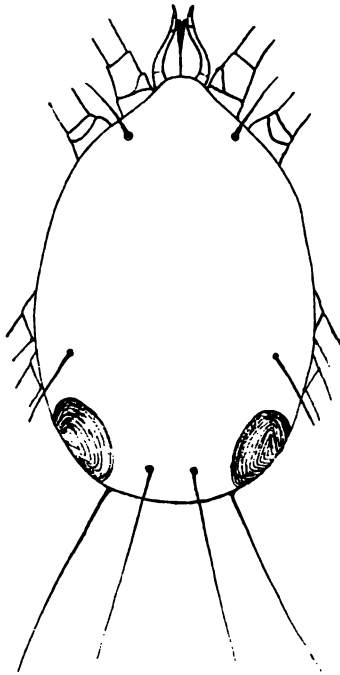


FIG. 6 — *Carpaglyphus alienus*, ♀

lishman thought he had produced by means of electricity. Not the least remarkable of the many strange habitats, is that in the following case:

Early in 1904 Dr. J. de Haan, Director of the Geneeskundig Laboratorium te Weltevreden of Batavia, Java, sent to me for determination some mites found in the urine of a patient affected with a kidney disease. Every time he passed urine some of these acarions were found surrounded in pussy matter.

There seemed no doubt to Dr. de Haan that it was a genuine case of endoparasitism. An acarologist familiar with the alleged habitats of various Tyroglyphids cannot suppress his suspicions in the case. Yet, as it is stated that mites were found in every passage of urine, it seems impossible to account for

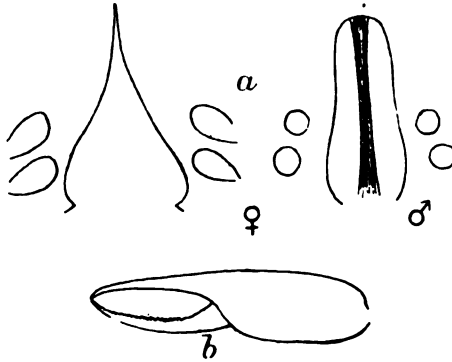


FIG 7.—*Carpaglyphus alienus*: a, genital openings, ♂ and ♀; b, mandible.

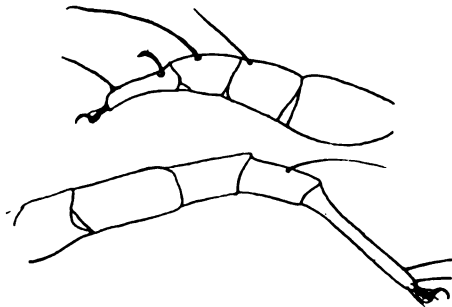


FIG. 8.—*Carpaglyphus alienus*, legs I and IV.

their adventitious occurrence. Were the mite of some other family it would not be so strange, but that a Tyroglyphid could get to the internal organs, other than the alimentary tract, seems beyond belief. Yet there cannot be the slightest doubt as to the systematic position of the mite as can readily be seen from the figures. The nature of the genital openings and the position of the long bristle on tibia I seems to place the specimens in the genus *Carpaglyphus*. The caroncles are not as distinct as in the one known species of this genus, but the position of the bristle on tibia I is unique. I shall therefore simply describe the species leaving the question of its occurrence to the future.

Carpoglyphus alienus, new species.

Body nearly elliptical, rather pointed in front, broadly rounded behind; without separation between cephalothorax and abdomen; with but few hairs above; a pair in front between legs I and II, a submarginal pair above leg IV, and two pairs of longer ones behind; the median pair are on the dorsum, the other pair on the posterior margin; a large dark elliptical spot each side behind. Legs of moderate length and slenderness; leg I has the long hair from near middle of penultimate joint; the basal clavate hair of tarsus is curved near tip. The caroncles are not very distinct, but the claws are large. In leg IV the tarsus is fully twice as long as the metatarsus. The vulva of the female, which is well forward and intercoxal, shows two divaricate lines, and each side two oval suckers. The male opening is farther back, and nearly three times as long as broad, rather broader behind, and the sides slightly concave; there are two circular suckers each side.

Various specimens found in urine, Batavia, Java.

It differs from *C. passularum* in the less hairy legs, and apparent lack of short hairs on dorsum, as well as in genital apertures.

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The following papers were submitted to and accepted by the Publication Committee:

REMARKS ON GENITALIC GENERA IN THE CULICIDÆ.

By HARRISON G. DYAR.

In a recent publication¹ Dr. E. P. Felt has figured the genitalia of the *genitalia* of a number of species of Culicidæ, and in a brief

¹ Bull. 79, N. Y. State Mus., 1904.

appendix erects seven new genera, describing the venation and genitalic characters of each. The venational characters seem to be of an indefinite nature, and we might as well frankly regard the genera as founded on the genitalia alone. These certainly show well marked and distinctive characters. I have received from Dr. Felt photographs of many of his slides and have had others prepared by the kindness of Mr. H. S. Barber. It is of especial interest that the genitalic groups run largely parallel to those defined on larval characters, in some cases con-

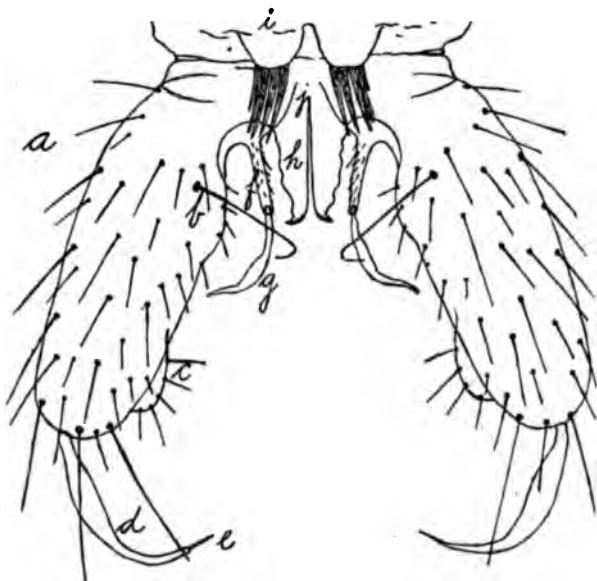


FIG. 9.—Male genitalia of *Grabhamia cantator* Coq.: a, side piece or basal segment of clasp; b, basal lobe of same, or claspette; c, sub-apical lobe of same; d, clasp filament or terminal segment of clasp; e, articulated apex of same; f, harpe, basal segment; g, harpe, terminal segment; h, harpago; i, appendage of 8th segment; j, position of the unci (they cannot be detected in the specimen before me).

firming larval affinities where it had been heretofore supposed that these were contradicted by the adults. A case in point is that of *Janthinosoma musicum*, *Culex jamaicensis* and *Taniorhynchus signipennis*. These larvæ are very peculiar and essentially alike. The adults have been considered unrelated; but the genitalia are in some respects very similar and place these forms close together. This leads me to conclude that the genitalic groupings, where reinforced by the larval ones, show natural divisions, and I am, therefore, in accord with Dr. Felt

in using them as the basis for genera. It is true that in general practice other characters than these are preferable, owing to the necessity of preparing the specimens and to the fact that the characters are shown by one sex only, and that the one not generally collected. I believe, however, that since the groups are natural ones it is probable that other recognition characters will be found. If they should not be, it might be better to reduce the genitalic genera to subgeneric rank, for practical reasons, without thereby losing sight of their value. It seems inevitable that the genus *Culex* shall be divided, and the genitalic divisions are more natural than those recently founded on scales and papal structure. As to the latter it is necessary to remove and mount the palpi, which is as practically objectionable a process as any connected with the study of the ♂ genitalia.

The sketch herewith of *Grabhamia cantator* Coq., shows the names applied to the different parts. They vary much in amount of development as well as in shape in the different species. *Anopheles* shows the simplest arrangement, scarcely distinguishable from the Corethrinae. This is in accord with the larval characters, since *Anopheles* larvæ are very close to some Corethrid forms, as *Eucoethra* and *Dixa*. The Culicinae have a small articulated tip to the terminal segment of the clasper, which appears to be lacking in the Aëdinae, although in *Uranotenia sapphirina* there is a small spine much resembling it and probably representing its rudiment. The species of *Culex* show the most differentiation, especially in the true *Culex* or *pipiens* group and these are the most specialized larvæ. We have thus a concordance in general as well as special characters between genitalic and larval structure.

I have thrown the forms known to me into a synoptic table of genera, which follows. A few new names are supplied to fill gaps left in Dr. Felt's groupings or as corrections. Nine generic names, out of a total of thirty-one credited to our fauna, are omitted, as I have had no material to dissect.

1. Harpes and harpagones absent or greatly reduced; clasp segment strong and longer than the basal segment. *Anopheles*
 Harpes and harpagones developed; clasp segment usually shorter than the basal segment. 2
2. Terminal clasp without a terminal articulated spine, though often otherwise modified, branched or spinous. 3
 Terminal clasp with an articulated spine which is usually apical; clasp usually simple, seldom modified 6
3. Clasp transparent, membranous. 4
 Clasp chitinous, solid. 5

4. Clasp inflated, lobed, irregular, apparently erectile *Ilyomyia*
Clasp broad, simple, with minute apical spine *Uranokenia*
5. Clasp enlarged, clawed, hirsute on the outer aspect *Deinocerites*
Clasp slender, bifurcate, arising subapically *Aedes*
6. Harpes filamentous or papillose, slender, delicate 7
Harpes not filamentous, chitinous or spined 11
7. Harpes filamentous; unci reduced or invisible 8
Harpes papillose-capitate; unci an undivided basal cone, *Janthinosoma*
8. Harpes broadened at base, not jointed; outer lobe of side piece finger-shaped *Protoculex*
Harpes not broad at base, jointed centrally 9
9. Side piece with a heavy terminal brush; harpes hooked . . . *Pseudoculex*
Side pieces without terminal brush 10
10. Harpes hooked by a slender retrorse spine *Culiseta*
Harpes not hooked *Grabhamia*
11. Clasp with an outward angle and spines; harpes touching to form a ring-shaped structure *Psorophora*
Without these characters; clasp simple 12
12. Terminal clasp expanded, narrow bladder-like 13
Terminal clasp filamentous 14
13. Basal lobe of side piece setose *Feltidia*
Basal lobe of side piece a thick chitinous rod *Coquillettidia*
14. Side piece with a subapical process within bearing setæ and filamentous or leaf-like appendages 20
Side piece without such a process 15
15. Clasp with the articulated tip subterminal *Ecculex*
Clasp with the articulated tip terminal 16
16. Side pieces short conical; harpes with long branch at base, *Stegomyia*
Side pieces long conical; harpes not so branched 17
17. Harpes with trifid apex; tip of clasp multiple divided . . . *Pneumaculex*
Harpes with simple or spinous apex 18
18. Appendicular tip of clasp long *Megarhinus*
Appendicular tip of clasp minute 19
19. Unci not forming a central projecting sac *Theobaldia*
Unci united into a large central projecting sac *Culicella*
20. Harpes nearly simple, dentate only 21
Harpes heavily spined, often recurved *Culex*
21. Leaf-like scale of apical lobe of side piece absent *Neoculex*
Leaf-like scale present; setæ arising from a second, basal lobe

*McInanoconion***Genus ANOPHELES Meigen.**

Type: bifurcatus Linn. The genitalic type has been figured by Theobald and Felt. Nine species are recorded from North America, viz: *maculipennis* Meig., *plumbeus* Hal., *bifurcatus* Linn., *punctipennis* Say, *pseudopunctipennis* Theob., *franciscanus* McC., *barberi* Coq., *crucians* Wied., *eiseni* Coq.

Genus CELLIA Theobald.

Type: pulcherrima Theob. The genitalia will probably prove similar to those of *Anopheles*. I have not seen them of either of the species recorded from North America, viz: *argyrotarsis* Desv., *albipes* Theob.

Genus CYCLOLEPPTERON Theobald.

Type: grabhamii Theob., the only species recorded from our region. The genitalia are unknown to me.

Genus ARRIBALZAGIA Theobald.

Type: maculipes Theob. This species is recorded from Trinidad and will doubtless be found in the southern portion of our region. The genitalia have not been examined.

Genus PSOROPHORA Desvoidy.

Type: ciliata Fab. We are credited with three species, viz: *ciliata* Fab., *howardii* Coq., *scintillans* Walk. The genitalia of *ciliata* have been figured by Dr. Felt.

Genus MEGARHINUS Desvoidy.

Type: hamorrhoidalis Fab. We are credited with seven species, viz: *rutilus* Coq., *portoricensis* Von Röd., *ferox* Wied., *grandiosus* Will., *hamorrhoidalis* Fab., *longipes* Theob., *separatus* Arrib. Mr. Barber has made me a nice mount of the genitalia of *portoricensis*, from which the characters given in the table were taken.

Genus STEGOMYIA Theobald.

Type: fasciata Fab. Besides this species, *sexlineata* Theob. may occur with us. The genitalia of *fasciata* are distinctive as may be inferred from the preceding table.

Genus PNEUMACULEX, new genus.

Type: signifer Coq. This species is peculiar in many ways and deserves a distinct generic appellation. The larva has besides the peculiar dorsal plate an enlargement of the tracheal tubes into a sort of bladder in the thorax, suggesting *Corethra*. In the ♂ genitalia the side pieces are conic, without apical lobe; basal lobe small but bearing two stout setæ; terminal clasp slender, enlarged a little outwardly with a multiple articulated tip. Harpes short, chitinous, concave, with trifid apex; harpagones small, slender, chitinous, acute; another pair of appendages more basally placed, shorter than the harpagones, with a terminal hook; a median, divided, double-tipped membrane (unci?).

Genus TÆNIORHYNCHUS Arribalzaga.

Type: titillans Walk. Theobald takes *fasciolatus* Arrib. as the type of *Tæniorhynchus*, but the first species is *tæniorhynchus* Arrib. (nec Walker) = *titillans* Walk., and should be the type. This species is also the type of *Mansonina* Blanchard, which will become a synonym of *Tæniorhynchus*. The species has been recorded from Trinidad and will doubtless be found in the southernmost part of our territory. I do not know the genitalia.

Genus COQUILLETIDIA, new genus.

Type: perturbans Walk. Theobald places this species in *Tæniorhynchus* Arrib., but not correctly, I believe. The genitalia are peculiar. Dr. Felt has prepared them from a specimen which I sent him, but the figure is not reproduced in his bulletin. The characters may be gathered from the table. Four species are referred here, viz: *richardii* Fic., *perturbans* Walk., *confinis* Arrib., *nigricans* Coq.

Genus FELTIDIA, new genus.

Type: jamaicensis Theob. Dr. Felt has taken *jamaicensis* as the type of *Grabhamia*, but Theobald mentions first *dorsalis* Meig. Of *jamaicensis*, Theobald gives a rough figure and Felt a good photograph. We have three species at present referable here, *jamaicensis* Theob., *cyanescens* Coq., *signipennis* Coq.

Genus JANTHINOSOMA Arribalzaga.

Type: discrucians Walk. We have five species, viz: *musicum* Say, *posticatum* Wied., *lutzii* Theob., *discrucians* Walk., *varipes* Coq. Dr. Felt has prepared the genitalia of *musicum* and *lutzii* which are much alike. He has figured the former.

Genus JOBLOTIA Blanchard.

Type: niveipes Theob. The name is a substitute for Theobald's *Trichosporon* (nec *Trichosporus* Macq.) The single species is recorded from Trinidad, but probably occurs with us. I have not seen the genitalia.

Genus ECCULEX Felt.

Type: sylvestris Theob., the only species. It has most remarkably distinct genitalia and is apparently not at all allied to *Grabhamia* as one would have supposed. Dr. Felt has published a photograph.

Genus PSEUDOCULEX, new genus.

Type: aurifer Coq. As noted below, I think this is a distinct generic type. The characters are given in the preceding table and in Dr. Felt's figure.¹

¹ Pl. 33, fig. 2.

Genus CULICELSA Felt.

Type: tæniorhynchus Wied., the only species properly referred here. Dr. Felt adds *aurifer* Coq., but I consider this to represent a distinct generic type. I am doubtful, moreover, whether the hook on the harpes is to be considered a generic character. If not, *Culiselsa* falls in with the following.

Genus GRABHAMIA Theobald.

Type: dorsalis Meig. Synonym, *Culicada* Felt, type *canadensis* Theob. I have not seen the genitalia of *dorsalis*, but Theobald figures the larva of it and the genitalia of a closely allied species. This is our largest genus. Sixteen species are referred here with certainty, viz: *canadensis* Theob., *dupreei* Coq., *sollicitans* Walk., *cantans* Meig., *atropalpus* Coq., *cantator* Coq., *varipalpus* Coq., *curriei* Coq., *impiger* Walk., *lazarensis* F. and Y., *pullatus* Coq., *trichurus* Dyar, *triseriatus* Say, *punctator* Kirb., *æstivalis* Dyar, *onondagensis* Felt, and twenty-five others more or less probably, viz: *trivittatus* Coq., *fitchii* F. and Y., *squamiger* Coq., *abfitchii* Felt, *testaceus* Wulp, *bigotii* Bell, *excrucians* Walk., *impatiens* Walk., *annulatus* Schv., *confirmatus* Arrib., *scholasticus* Theob., *inflictus* Theob., *hirsuteron* Theob., *rubidus* Desv., *nigripalpus* Theob., *janitor* Theob., *palus* Theob., *similis* Theob., *bimaculatus* Coq., *discolor* Coq., *fletcheri* Coq., *nanus* Coq., *niveitarsis* Coq., *vittata* Theob., *spenceri* Theob. The genitalia of several have been figured.

Genus PROTOCULEX Felt.

Type: serratus Theob., the only species so far represented. Dr. Felt has briefly described the genitalia, though he has not figured them. I have a fine photograph of the parts from him, and a figure may be expected later, I presume.

Genus THEOBALDIA Neveau-Lemaire.

Type: annulata Meig. *Culiseta* Felt is a synonym, with type *absobrinus* Felt. Five species will be referred here, though their synonymy is not settled. They are *annulata* Meig., *incidens* Thom., *consobrinus* Desv., *absobrinus* Felt, *magnipennis* Felt.

Genus CULICELLA Felt.

Type: dyari Coq., well figured by Dr. Felt. *Melanurus* Coq. also falls here, having essentially the same structure, though the basal plate is less developed. Dr. Felt referred it to *Ecculex*, but I cannot see that it has any affinity therewith.

Genus NEOCULEX, new genus.

Type: territans Walk. This species may be separated from *Culex* proper on the characters given above. Dr. Felt figures

a portion of the genitalia, but his figure does not show the peculiar basal organs.

Genus CULEX Linnæus.

Type: pipiens Linn. As now restricted, the genus is a small one. But five species are certainly referred to it, viz: *pipiens* Linn., *tarsalis* Coq., *restuans* Theob., *fatigans* Wied., *salinarius* Coq.; to which should probably be added *secutor* Theob.

Genus MELANOCONION Theobald.

Type: atratus Theob. Though belonging near *Culex* the male genitalia show a distinct type. A second species, *spisipes* Theob., is recorded from Trinidad.

Genus DEINOCERITES Theobald.

Type: cancer Theob. The genitalia have been figured by Theobald and are very peculiar. The same may be said of most of the *Aëdinæ*.

Genus AEDES Meigen.

Type: cinereus Wied. Two species are credited to our fauna, viz: *fuscus* O.-S. and *perturbans* Will. The genitalia of *fuscus* have been figured by Dr. Felt.

Genus HOWARDINA Theobald.

Type: walkeri Theob. The genitalia are unknown to me.

Genus WYEOMYIA Theobald.

Type: grayii Theob. We have four species, viz: *grayii* Theob., *pertinans* Will., *trinidadensis* Theob., *smithii* Coq. The peculiar genitalia of *smithii* have been briefly described by Dr. Felt.

Genus PHONIOMYIA Theobald.

Type: longirostris Theob. Not studied.

Genus URANOTÆNIA Arribalzaga.

Type: nataliæ Arrib. We have three species, viz: *sapphirina* O.-S., *lowii* Theob., *socialis* Theob. Dr. Felt gives the genitalia of *sapphirina*.

Genus AEDOMYIA Theobald.

Type: squammipenna Arrib., is recorded from Trinidad.

Genus HÆMAGOGUS Williston.

Type: cyaneus Fab., not studied.

ON THE SPECIES OF SPHENOPHORUS RELATED TO PERTINAX OL., WITH DESCRIPTIONS OF OTHER FORMS.

By F. H. CHITTENDEN, Sc. D.

The series of descriptions of new species of *Sphenophorus* presented in this paper were, for the most part, prepared in the spring of 1903. Before the main work on this genus, which it is contemplated will be in the form of an illustrated revision, could be completed, press of other more imperative duties caused its almost complete abandonment. As a consequence the writer has not found time to bring together all of the matter desired to be presented on this topic. The present paper is in continuation of two others published in Volume IV of the Proceedings, pp. 128-137, which treated of species hitherto considered as *simplex* LeConte and *placidus* Say, respectively. Its presentation for publication at this time is made necessary because of the desirability of returning material which has kindly been loaned by various institutions and private collectors for study, and because it cannot now be foretold when opportunity will offer for the completion of the monographic work originally planned. This preliminary article will be followed by one or more additional contributions as rapidly as opportunity offers.

As with the several species that have been generally placed in collections as *placidus* Say, we find that *pertinax* Ol. readily separates into several undescribed forms in addition to those which were named by Dr. Horn in his paper on the Curculionidæ of the United States published in 1873 (Proc. Amer. Philos. Soc., vol. XIII, 1873, pp. 417-421.) The species of this group may be characterized as follows:

PERTINAX group.

Rostrum arcuate, from three-fourths to the same length as the thorax, considerably dilated at base, channeled, interocular puncture at base terminating in a finely impressed line beyond the scrobes.

Thorax usually distinctly trivittate, occasionally subobsoletely so (*abrasus* and *maidis*); vittæ entire, subequal in length and width, median not forked anteriorly, extending nearly or quite from apex to base; lateral vitta with an outer branch extending from near the middle nearly to the base.

Elytral intervals unequal in width, and varying in convexity.

Third joint of anterior tarsi about twice (*i. e.*, more or less) as wide as the first joint; of the middle pair perceptibly narrower than the anterior; of the posterior pair one-sixth to one-half wider than the first with occasionally slight individual variation in the same species. For convenience of reference this may be expressed in the following formula: ant. 2+; mid. 2-2; post. $\frac{1}{2}$ - $\frac{1}{2}$.

The sexual characters are strongly developed, especially in the ♂ of many forms. Thus, in *ludovicianus* the metasternum and first abdominal segment are as deeply and widely concave as in the *æqualis* or *ochreus* group. The species are mostly large, from three-eighths of an inch in length to double that size.

Rostrum subcylindrical, slightly narrower at extreme base, angles rounded.

Elevated intervals irregular and interrupted; unelevated intervals interrupted by elevated shining black areas. Second abdominal segments of ♂ without transverse brush of setæ.

Thoracic vittæ distinct.

Lower surface coarsely punctate. Ventral concavity of ♂ moderately deep; metasternum with tuft of long, sparse, fine hairs nearly covering each side of posterior half. Tibiæ sparsely fimbriate with short bristle-like hairs. U. S.,

pertinax Olivier.

Lower surface more finely punctate. Ventral concavity of ♂ more shallow; metasternum with a few minute hairs each side along posterior margin. Tibiæ densely fimbriate with long hairs. Cal., Nev., Ore. *typhæ*, n. var.

Thoracic vittæ subobsolete. Cal. *abrasus*, n. sp.

Rostrum moderately, subequally compressed, posterior angles of apex acute or subacute, scarcely produced.

Thoracic vittæ with curved or sinuous outlines.

Second abdominal segment of ♂ with a short transverse brush of brown setæ; metasternum of ♂ with a lateral row of short setæ each side in concavity.

Elytra mostly opaque gray; odd intervals convex, black and shining; even ones thickly coated, flat except a narrow, more or less distinctly elevated, smooth black median line.

Rostrum about three-fourths as long as thorax.

E. U. S. *setiger*, n. sp.

Elytra mostly shining black; even intervals nearly as convex and prominent as odd ones.

Rostrum as long as, or five-sixths the length of, the thorax. La., Tex. *ludovicianus*, n. sp.

Elytra, except humeri and basal elevated portions of first and sometimes third intervals, covered with natural thick ochraceous coating which extends to the sides. Other intervals subequal. Body slender. Fla., *peninsularis*, n. sp.

Elytra with natural *thin* subsericeous gray coating, black lines between the stria punctures. Body robust, rostrum shorter. Mich.--Cal. *robustus* Horn.

Rostrum strongly compressed at apical fourth or fifth, and suddenly bent backward, anterior face of apex flat or slightly concave, posterior angles obtuse. Thoracic vittæ subparallel.

Elytral intervals alternately black or coated.

Thoracic vittæ moderately curved, nearly straight, moderately separated. Elytral intervals 1, 3, 5, and 7 long, broad and costiform, black and shining; 2, 4, 6, and 8 narrower, with distinct alutaceous coating. Scutellum elongate, concave. Anterior face of apex of rostrum more or less concave. First ventral segment of ♂ with small dense tuft of brown setæ each side, sometimes much abraded, metasternum sometimes with a few scattering setæ. E. U. S. and N. W. *costipennis* Horn.

Thoracic vittæ less elevated, feebly curved and sinuous. Intervals 1, 3, 5, and 7 with *elevated* portions narrower; *elevated* portion of 3 and 5 short and narrowed apically, of 7 still narrower or wanting. Scutellum flat, deltoid. Anterior face of apex of rostrum flat or feebly concave. Ventral segments 1 and 2 of ♂ nearly uniformly sparsely villous, last with long hairs. Mass., N. Y., Va., D. C. *villosiventris*, n. sp.

Elytral intervals all black and polished.

Thoracic vittæ more curved or sinuous, wider and less distinctly separated. Elytral intervals with alternate widest ones moderately elevated, narrower ones nearly or quite naked. Scutellum elongate, concave. First ventral segment and metasternum of ♂ with lateral tufts of brown setæ. Utah,

laevigatus, n. sp.

Rostrum strongly, subequally compressed throughout, anterior face of apex deeply concave, posterior angles acutely produced.

Thoracic vittæ subobsolete, frequently confluent anteriorly. Lower surface scarcely less strongly punctate at the middle than at the sides.

First ventral segment of ♂ feebly concave. Kans., Ala., S. C. *maidis*, n. sp.

Sphenophorus pertinax Olivier.

Calandra pertinax Olivier, Entom. Hist. Nat. des Insectes, v, No. 83, p. 90, pl. 28, fig. 417, 1807.

Sphenophorus pertinax Gyllenhal, in Schönherr's Gen. et Sp. Curc., iv, p. 938, 1837; Horn, Proc. Am. Phil. Soc., pp. 418, 419, 1873.

Sphenophorus truncatus Say, Descr. N. A. Curc., p. 22, 1831; Compl. Writings, Lec. Ed., i, p. 288.

Sphenophorus ? *canaliculatus* Boheman, in Schönherr's Gen. et Sp. Curc., viii, 2, p. 253, 1845.

Length 11-15 mm., width 4.2-5.5 mm.

This species is correctly named in most collections, although it frequently happens that the label specimen is quite otherwise, *e. g.*, *ludovicianus*. The outline illustration of the rostrum (fig. 10, a), which is about four-fifths the length of the

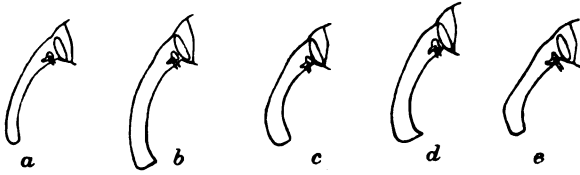


FIG. 10.—Outline views of the rostrum in *Sphenophorus*: *a*, *pertinax*; *b*, *ludovicianus*; *c*, *costipennis*; *d*, *maidis*; *e*, *villosiventris*—all greatly enlarged (original).

thorax, will facilitate its separation from species with which it is confused, *costipennis* among others.

The distribution extends from New York City to Utah, but southward the typical form does not appear to have been collected beyond the District of Columbia. It is a very common species and occasionally injurious to corn.

With erstwhile varieties eliminated as species, *pertinax* still exhibits considerable variation. The merely colorational varieties are scarcely worth indicating. Some specimens have the general color dull rufous, with the vittæ and alternate intervals less distinctly elevated.

Var. *australis*, new variety.

Larger than typical *pertinax*, with slightly longer rostrum. Surface coating more dense, ochraceous, gray-brown or cinereous. Median thoracic vitta narrower at base than at apex, in which respect it differs from *typhæ* which it greatly resembles. Third elytral intervals obsolete or interrupted, in apical half or more, fifth still shorter and more interrupted. Mesepisternum normally completely covered with coating, but becoming abraded with age.

New Orleans, La., October 26 (Soltau); "Louisiana," July 10, 1873 (C. V. Riley); Arizona (1 ♀ so labeled, possibly by error).

Type—No. 8220, U. S. National Museum.

Cinereous-coated individuals are from Texas (Roberts) and western Kansas (Popenoe).

The writer is disposed to consider this form as a geographical race.

Var. *typhæ*, new variety.

Of similar appearance to variety *australis*; moderately shining black, with sparser dull ochraceous coating. Thoracic vittæ less elevated, wide; median at base as wide or wider than at apex; suddenly and widely dilated just in front of middle, sometimes contiguous to the lateral. Elytral intervals with the third and fifth at least three-fourths shining black, all unelevated intervals with small elevated areas, mostly at the sides, co-

alescing with the larger elevated ones. Tibiæ densely fimbriate with long hairs.

♂.—Ventral concavity shallower than in *pertinax*, more sparsely punctate, punctures shallow along the middle; metasternum with a few minute hairs each side along posterior margin; first abdominal segment apparently without hairs.

California: Los Angeles (Koebele); Long Beach, July; S. Monica and Riverton, May 24 (Fall); Reno, Nev., July 2 (Wickham).

Type.—No. 8221, U. S. National Museum.

Reared from roots of *Typha latifolia*, September, 1886, at Los Angeles by Mr. Albert Koebele.

I have designated this form as a variety, since there is some doubt of its specific distinctness. It is certainly entitled to racial rank, or might more properly be classed as a subspecies.

***Sphenophorus abrasus*, new species.**

Form like that of *pertinax*, with which it closely agrees in many characters which will, therefore, not be repeated; color moderately shining black, with dark gray alutaceous coating, very sparse, visible on the thorax only at the sides and at middle of base and in portions of the elytral intervals. Rostrum two-thirds as long as thorax, feebly punctate even at base. Thorax, except a small strip at sides and a very small space each end of middle, which are coarsely punctate, nearly uniformly smooth, sparsely and finely punctulate; vittæ strongly confluent, nearly obsolete, surface having the appearance of being abraded. Elytral intervals alternate in width, but less in convexity, discal ones, 2, 4, and sometimes 6, more covered with elevated black areas than with gray alutaceous deposit; 7 and sometimes 6 less convex and more nearly covered with deposit. Lower surface very sparsely, finely and somewhat indistinctly punctate, scarcely more coarsely on last segment.

♂.—Ventral concavity shallow, as in *typhæ*; apex of pygidium more rounded at sides; anterior and middle femora sparsely fimbriate on inner surface; posterior femora subglabrous.

♀.—Abdominal surface very finely and sparsely punctate; pygidium with apex more narrowed, sides distinctly curved inward; anterior femora nearly glabrous, posterior glabrous; middle femora with very minute short hairs.

Length 12 mm., width 4.5 mm.

California (1 ♂, 1 ♀, Coll. Roberts).

Type.—No. 8222, U. S. National Museum. Types kindly presented by Mr. C. H. Roberts.

More nearly related to *pertinax* than to *typhæ*, and quite distinct from either by the nearly obsolete vittæ which are more strongly confluent than in extreme forms of *ludovicianus* or *maidis*.

Sphenophorus setiger, new species.

Similar to *ludovicianus*, but smaller and proportionately more robust. General color black, with cinereous or gray-brown alutaceous coating. Rostrum shorter, three-fourths to four-fifths as long as thorax, otherwise scarcely different. Elytra more nearly opaque than shining; striae more distinct; intervals unequal in width and convexity, smaller (even) intervals less developed, and variable in convexity; elevated shining black portions as follows: 2 a thin, slightly interrupted line half as long as 1; 4 a little wider and longer; 6 short or wanting; sometimes 1, 3 and 5 are the only intervals that are black. Lower surface less strongly punctate.

♂.—Rostrum a little shorter and more slender, thorax scarcely narrower anteriorly than in ♀; ventral concavity deep and broad; metasternum with a row of short brown setae just within the lateral margin, a few minute setae each side of the first abdominal segment, second with a transverse brush of longer dark ochraceous hairs. Fossa of last ventral segment of variable depth, usually more shallow than in *ludovicianus*.

♀.—Scarcely larger than the male, otherwise as in *ludovicianus*, which is true of most other obvious characters that have not been described.

Length 10.0–12.5 mm., width 4.0–5.2 mm.

Highland, N. J., July 2 (Chittenden); "N. J.," Ithaca, N. Y. (Chittenden); Massachusetts (Ulke); Burlington, Vt. (Roberts); Coney Island, N. Y. (Roberts); "N. Y.," Maryland and District of Columbia (Ulke); Virginia Beach, Va., July 16 (Hubbard and Schwarz); Pennsylvania; Iowa; Illinois (Ulke); "Dakota" (Ulke); Texas.

Type.—No. 8223, U. S. National Museum.

Sphenophorus ludovicianus, new species.

Of the same form as *perlinax*, but larger, with all elytral intervals black and convex. General color polished black, with a natural ochraceous alutaceous coating which covers the thoracic interspaces, elytral striae, inner surface of the tibiae, the pygidium, and the larger punctured areas.

Head finely sparsely punctulate. Rostrum the same length as, or scarcely shorter than, the thorax, slender, moderately dilated at base and at apex, moderately compressed, a little more strongly at the apex, moderately arcuate, more distinctly toward apex; surface finely punctulate, at base more coarsely and distinctly; base distinctly channeled with distinct interocular puncture, the whole forming a lanceolate depression terminating apically in a short impressed line.

Thorax a little longer than wide, strongly arcuate at the sides, moderately constricted at apex, basal half subparallel but somewhat constricted at extreme base; surface with three feebly or moderately elevated, entire, nearly smooth, broad vittae; median vitta strongly and suddenly dilated just in front of middle, the apical half forming a wide cuneiform or triangular space, basal half narrower toward base; lateral vittae nearly as wide

at basal half as the dilated portion of the median, rather feebly separated from the median by the foveate interspaces. Scutellum broadly, sometimes feebly sulcate.

Elytral striæ distinctly punctate; intervals alternating in width but equal or nearly equal in convexity, surface smooth, shining, faintly, minutely, and sparsely punctulate. Pygidium coarsely and strongly punctate, clothed with short bristly reddish hairs, becoming more dense toward the apex and forming tufts at the sides; apex truncate in both sexes.

Lower surface coarsely, sparsely punctate at the sides; second, third fourth, and anterior half of last abdominal segments faintly punctulate at middle. Legs finely punctulate.

♂.—Body more slender, thorax narrower anteriorly; rostrum more slender, just perceptibly shorter and with apex less acute. Metasternum and first abdominal segment deeply broadly concave at middle, with a long row of short brown bristly hairs each side within the concavity; second abdominal concave on the anterior portion with the more elevated portion perfectly curved and bearing at its summit a transverse brush of dark bristly hairs; last segment also concave, forming between its middle and the posterior margin a deep or moderately deep fossa, coarsely punctate interiorly and with a row of smaller punctures near the posterior margin.

♀.—Metasternum slightly concave, abdomen convex, last segment nearly flat at apex.

Length, ♂ 11–14 mm., ♀ 15–16 mm.; width 4.5–6.0 mm.

New Orleans, La., March 11, 14, October 26 (Soltau); "Louisiana;" Texas. The geographical distribution is evidently limited to the Gulf region, and the center of greatest abundance is probably in the western Gulf States near the seaboard.

Type.—No. 8224, U. S. National Museum.

Distinct from all other species of the genus on account of its longer rostrum (fig. 10, *b*), and from related species by its subequally convex elytral intervals. It is the largest North American species outside of the *aqualis* group.

Say's description of *pertinax* fits this species, as well as the true *pertinax* of Olivier, but his *interstitialis* is different, nor does Horn's interpretation of Say's *interstitialis* apply, since the latter states that the body beneath is as coarsely punctured at the sides as at the middle.

Sphenophorus peninsularis, new species.

Form similar to *setiger*, but distinctly more slender. General color black and with an abundant clay-colored natural coating covering a large portion of the dorsal and ventral surfaces. It covers the apical constriction except a transverse band, narrower than the head, which joins the median vitta, also the elytra, except the humeri and anterior half of the sutural and third elytral intervals.

Rostrum fully five-sixths as long as the thorax, at apex slightly more dilated, and slightly subacutely produced on the posterior face. Thoracic vittæ about as in *setiger* but more widely separated, posterior third of median very narrow. Elytra without subapical callosity, striæ finely punctate, intervals feebly convex except anterior half of sutural and third, which are a little more prominent. Lower surface subopaque or feebly shining, faintly, rather coarsely punctate in thoracic region, more faintly in abdominal region. Natural coating completely covering the mesepisternum, metepisternum and metepimeron, sides of the metasternum and posterior portions of the abdominal segments.

Length 14 mm., width 4.8 mm.

Jacksonville, Fla. One ♀ and one imperfect specimen, a donation to the National collection by Dr. Wm. H. Ashmead.

Type.—No. 8227, U. S. National Museum.

Sphenophorus robustus Horn.

Sphenophorus robustus Horn, Proc. Am. Phil. Soc., pp. 419, 420, 1873.

Most closely allied to *setiger* and *peninsularis*, but of more robust form, and differing also by the more arcuate rostrum, which is a little more compressed and truncate at the apex with the inner or posterior angle acute. The thoracic vittæ are more elevated; median vitta distinctly dilated at middle, posterior portion broad and attaining the base, lateral vittæ slightly sinuous internally, gradually from apex to base, lateral branch feeble. Elytra finely, distinctly striate and punctate; intervals flat, subequal; surface evenly clothed with a thin cinereous or plumbeous subsericeous coating.

♂.—Ventral concavity feebly concave, nearly as coarsely punctate as at the sides.

♀.—Normal, with ventral punctures smaller and sparser.

Length 11–14 mm., width 4.5–5.5 mm.

This species ranges from Indiana and Michigan through Wisconsin, Minnesota, and western Kansas to California. It is a northern form not occurring in the East. Nothing appears to be known of its habits, references to *robustus* and its injuries to corn being due to a distinct species, my *S. maidis*.

Sphenophorus costipennis Horn.

Sphenophorus costipennis Horn, Proc. Am. Phil. Soc., p. 420, 1873.

Length, 7–12.5 mm.; width, 3–4.5 mm.

This species, with *villosiventris* eliminated, should be easily distinguished by the characters furnished in the table. The female is not so readily separated. In the structure of the rostrum these two forms exhibit a very slight difference. The average size is a little less than *pertinax*. There is considerable variation as regards dimensions and color, which, however, do

not indicate geographical races. The rostrum (fig. 10, c) is somewhat variable in contour.

The material examined shows this to be the most northern form in our fauna. It occurs commonly from the Atlantic to the Pacific, from Massachusetts through our most northern States and Ontario, Canada, to Winnipeg, Manitoba, and Kamloops, B. C.

***Sphenophorus villosiventris*, new species.**

Form similar to *costipennis*; black with humeri, antennæ, tarsi and some other portions of the legs and of the ventral surface piceous or reddish; surface coating brownish gray, subsericeous, somewhat dense, especially on apical portion of elytra.

Rostrum perfectly straight in middle three-fifths of anterior face, apical fifth suddenly and strongly bent backward. Thoracic vittæ moderately elevated, subparallel, median little wider near middle. Scutellum deltoid, flat. Elytral striæ closely punctate; alternate intervals narrow, slightly elevated, third narrowing in posterior half, vanishing before attaining the apex, fifth striæ narrower and shorter, seventh coated, apical tubercles inconspicuous, narrow. Lower surface with very shallow punctures. Pygidium with longer hairs than in *costipennis*.

♂.—Metasternum scarcely concave, with a few scattered setæ. First ventral segment moderately concave, coarsely punctate, punctures with short setiform hairs, second abdominal finely punctate, punctures with short and finer hairs, last segment scarcely more coarsely punctate at base than second to fourth, with long hairs.

♀.—Does not appear to differ from *costipennis* by any sexual characters except those of the pygidium.

Length, 10–12 mm., width, 3.7–4.4 mm.

Buffalo, N. Y.; Ithaca, N. Y. (Chittenden); Ft. Monroe, Va. (Hubbard and Schwarz); Long Island, Massachusetts, Maryland and the District of Columbia (Ulke).

Type.—No. 8225, U. S. National Museum.

This is a most peculiar species, although to outward appearance merely *costipennis* with weakly elevated elytral intervals. It apparently combines the characters of several species, having a similar rostrum (fig. 10, c) to *lævigatus*, thoracic vittæ much as in *costipennis*, elytra between *peninsularis* and *setiger*, while the hirsute ♂ abdomen is very like that of the *æqualis* or *ochreus* group.

***Sphenophorus lævigatus*, new species.**

Of similar form to *costipennis*, but smaller, more slender, about two-fifths as long as wide, and with elytral costæ less prominent. Color deep shining black, antennæ, tibiæ and tarsi dark piceous; alutaceous coating cinereous, very thin and sparse like a fine bloom, showing more or less dis-

tinctly between the interspaces, feebly at the apices of the elytra, on the pygidium and in the larger surface punctures, often nearly wanting.

Head moderately sparsely finely but distinctly punctulate. Rostrum three-fourths as long as the thorax, slender, strongly compressed, moderately dilated at base, a little stronger over the scrobes, gradually feebly dilated toward apex; moderately arcuate, more strongly and nearly equally on the posterior margin; on the anterior surface protuberant at basal fourth, nearly straight on middle half and more strongly curved and compressed at the apical fourth; apex rounded anteriorly, obtusely angled posteriorly; surface finely sparsely punctulate; punctures larger and stronger at base, which is deeply narrowly channeled with interocular puncture well defined.

Thorax nearly one-fourth longer than wide, moderately constricted at apex, vittæ broad, strongly elevated, entire, subparallel; lateral broadly branched; intervals coarsely, densely punctate, transversely subrugose in some individuals. Scutellum elongate, broadly concave.

Elytra deeply striate, striæ interrupted by moderately large rounded punctures, 20-24 on the first two discal striæ; intervals rather feebly alternate in width and in convexity, the first, third and fifth finely feebly punctulate, first and third biserially, fifth biserially only at base, the other intervals scarcely less elevated, also polished black, distinctly and finely uniserially punctate. Pygidium sparsely coarsely and deeply punctate, with short yellowish white hairs and with the usual apical tufts pale yellowish.

♂.—Ventral surface less coarsely punctate than in *costipennis*; prosternum sparsely punctate, last segment more coarsely. Metasternum and first ventral segment broadly feebly concave, metasternum with a few short dark brown hairs each side of the posterior margin, first ventral with a broad longitudinal row each side, converging posteriorly.

♀.—Ventral surface much more finely punctate, the punctures very fine and sparse on the prosternum and middle of the first to fourth abdominal segments.

The sexes do not differ in size or in general appearance.

Length, 10-11 mm., width, 3.6-4.2 mm.

Salt Lake City, Utah, June 14 (Hubbard and Schwarz).

Type.—No. 8230, U. S. National Museum.

Readily distinguished from *costipennis* by the nearly total absence of natural alutaceous coating, the deeply punctate, scarcely costiform elytra, pale pygidial vestiture and the larger tufted areas in the ventral concavity of the ♂.

Sphenophorus maidis, new species.

Body two-fifths as wide as long, of robust appearance because of the subquadrate thorax which is nearly as wide as the elytra; general color black or piceous, moderately shining; alutaceous deposit on unelevated surfaces

inconspicuous, appearing to be normally dark rufous or piceous velvety when the extraneous argillaceous covering does not persist.

Rostrum three-fifths the length of the thorax, considerably arcuate, strongly subequally compressed, apex prolonged at the posterior angle with an acute spine, producing the appearance of greater curvature of the inner surface, base feebly protuberant, moderately dilated; anterior face of apex broadly deeply concave; surface minutely punctate, more distinctly and densely at base, base moderately deeply channeled with distinct deep interocular puncture and short impressed line.

Thorax longer than wide, fully three-fourths as long as the elytra, sides usually widest just in front of middle, anterior third suddenly and very strongly arcuate and constricted at apex, posterior two-thirds or three-fourths subparallel, or gradually narrowing to the base which is feebly bisinuate. Vittæ feebly elevated, tending toward obsolescence, moderately finely but distinctly and sparsely punctate, more coarsely and densely at the ends; median vitta extending from a fine line and rapidly widening to a point just in front of the middle where it is broadly dilated, then more abruptly narrowed, extending in a narrower line to near the base; lateral vittæ sinuous with a tendency to become confluent with the median in the apical half, generally a little wider in basal half but narrower than the median, branch wide but ill-defined; interspaces and surface at sides coarsely foveate-punctate, punctures becoming confluent, especially posteriorly at sides. Scutellum deeply broadly concave.

Elytra little wider than the thorax; striæ usually deep and well defined, distinctly closely punctate; intervals with first, third and fifth elevated, with two or more series of rows of fine punctulation; first or sutural with basal third triseriately, posterior two-thirds biseriately punctulate; third widest and most elevated, with four or five rows of fine punctulations; fifth biseriately punctulate; seventh little or not at all more elevated than the remaining intervals; intervals 2, 4, 6, 8, as also 7, more coarsely and closely uniseriately punctulate. Pygidium deeply, coarsely and rather sparsely punctate, with sparse golden yellow hairs proceeding from the punctures and forming a short tuft each side, frequently abraded.

Lower surface coarsely and rather densely punctate, scarcely less strongly at the middle than at the sides, punctures largest at the middle of the metathorax. Punctures of the metepisterna (side pieces) more or less confluent. Second, third and fourth abdominal segments nearly uniformly punctured throughout, like the legs.

♂.—First abdominal segment very feebly concave; pygidium truncate at apex.

♀.—First ventral scarcely different; pygidium narrowed and rounded at apex.

Aside from the differently shaped pygidium and the slightly shorter and less compressed rostrum there is little difference between the sexes.

Length, 10–15 mm., width, 4.5–6.0 mm.

Augusta, Kansas (E. L. Williams); Riley Co., Kans. (P. J. Parrott); Florence, Kans.; Dadeville, Ala. (S. M. Robertson); Wetumka, Ala. (F. S. Earle); Columbia, S. C. (L. O. Howard); Ballentine, S. C. (J. Duncan); Texas (Ulke, 1 ex.); "Mich." (Knaus).

Type.—No. 8226, U. S. National Museum.

A very injurious species, destructive to corn in both larval and adult stages in the localities given, except Texas and Michigan.

Owing to the somewhat general confusion of *maidis* with *robustus* and *pertinax*, especially in economic literature, it has been included in the table of the *pertinax* group, although it possesses quite obvious characters which might justify its removal to a class by itself. Viewed from the dorsal surface, it bears a greater resemblance to *scoparius* than to any other species. The rostrum (fig. 10, *d*) is unique in this group. In a natural arrangement the last mentioned species would follow together with *cariosus*, each constituting a distinct group.

There are two singular species which so greatly resemble others of the *pertinax* group that they may properly be described in this paper, although in reality they do not, on account of their tarsal characters, fall in the same class. A third form, which displays no affinity to any other group completes the list of descriptions.

UNCLASSIFIED SPECIES.

***Sphenophorus incongruus*, new species.**

Superficial appearance of *costipennis*, more slender, black with light ochreous coating, covering thoracic interspaces, elytra except three intervals and four callosities, the larger punctures on sides, and the mesepimera.

Rostrum two-thirds the length of the thorax, moderately arcuate and compressed, a little more strongly at basal and apical fourths, anterior face of apex flat, posterior face suddenly bent forward, interocular puncture distinctly rounded, producing a strongly obtuse angle.

Thorax one-fourth longer than wide, posterior two-thirds subparallel. Vittæ polished black, narrow, moderately elevated, continuous, subparallel; median slightly dilated in front of middle; lateral as wide in basal half as median where dilated, at which point they are narrow with strong curvature on the medial (?) side, branch feebly indicated. Interspaces wide. Scutellum polished, deeply concave.

Elytral striæ very thin, with small punctures remotely placed. Intervals 3 and 5 and sutural half of 1 moderately shining, feebly elevated in apical half or more, 1 with a single row of fine closely placed punctures

along the suture, 3 and 5 either uni- or bi-seriately punctulate, humeral and subapical callosities well marked, the latter long.

Ventral surface sparsely foveate-punctate, coarsest on metasternum, sparse and finer on first, still finer on second to fourth ventral segments.

♂.—Pygidium truncate, ventral concavity moderately shallow.

♀.—Pygidium a little more narrowed to apex, which is moderately rounded.

Length, 9–11 mm., width, 3.3–3.8 mm.

Wisconsin (1♂, coll. Roberts); Maryland (1♂, 1♀, coll. Ulke.)

Type.—No. 8228, U. S. National Museum. Mr. Ulke's specimens are in the Carnegie Museum, Pittsburg, Pa. The Wisconsin example has been kindly given to the National Museum by Mr. C. H. Roberts.

In some purely superficial characters there is great resemblance between this species and *costipennis*, and *villosiventris*, but the singular construction of the rostrum precludes its classification with those species, while the tarsal structure prevents its being placed in the *pertinax* group. The third joints of all the tarsi are very little wider than the first. The club of the antenna is wide, the funicular joints very narrow, and the pedicel is very wide and rounded. The antennal structure of preceding species is radically different, the club and pedicel being comparatively smaller and the funicular joints larger, thus preventing their being grouped together.

***Sphenophorus robustior*, new species.**

Of similar appearance to *robustus* but still more robust, and shorter, with shorter rostrum and less elevated vittæ. Black with much gray coating above.

Rostrum three-fourths the length of thorax, strongly subequally compressed, bent backward in apical third where it gradually enlarges to the apex, which bears a small, moderately deep, rounded concavity, posterior face at apex subobtuse. Base rather broad, with interocular puncture usually not clearly defined.

Thorax with vittæ feebly elevated, somewhat coarsely and densely punctate; median not attaining base, lateral with lateral branch variable. Scutellum smaller than in *robustus*. Elytra deeply striate, finely punctate; intervals 3 and 5 wider, remainder subequal in width; 1 strongly elevated, 3 and sometimes 5 slightly elevated and black apically. Intervals 1, 3, 5 and 7 biseriately punctulate except at base, remainder uniserially and a little more coarsely and not so closely punctulate.

♂.—Pygidium pentagonal, with pale gold hairs scarcely extending out of the punctures. Lateral tufts minute. Lower surface moderately coarsely punctate; ventral concavity moderate.

♀.—Pygidium narrow, rounded at apex; punctures deeper, hairs scarcely visible; lower surface more finely punctate than in *robustus*.

Length, 10–11.5 mm., width, 4.5–4.8 mm.

Cook Co., Ill.; “Ills.” (Forbes and Hart).

Type.—No. 8229, U. S. National Museum. Types kindly presented by Messrs. Forbes and Hart. Cotypes in collection of Illinois State Laboratory of Natural History.

This species has been compared with *robustus* merely because of the superficial resemblance of the two. As a matter of fact the two species do not belong to the same group. The coarse punctation of the vittæ and the finer punctation of the elytra alone would distinguish them even without the peculiar tarsal structure, which is similar to *incongruus*.

Sphenophorus pontederiæ, new species.

Form similar to *venatus*, about one-third as wide as long, general color dull black without alutaceous coating.

Rostrum four-fifths the length of the thorax, slender, nearly perfectly cylindrical, moderately dilated at base, a little more above the scrobes, dilated portion rounded, moderately rather narrowly canaliculate, interocular puncture rounded, usually deep; surface somewhat sparsely and finely punctulate except basal portion. Head sparsely punctulate, nearly smooth.

Thorax longer than wide, moderately arcuate, gradually narrower to the apex, apical constriction not strong; disc densely coarsely and very deeply punctate, the punctures frequently confluent. Vittæ broad shining, feebly elevated, and finely sparsely punctate; median vitta bifurcate inclosing an apical fossa and extending in a faint line through fossa but not attaining the base of the thorax, broadly dilated at and in front of the middle; lateral vittæ extending from the forked portion of the median vitta with which they are confluent and curving around the expanded portion of the median vitta to basal margin of thorax, being partially interrupted at apical third. Scutellum polished, moderately concave.

Elytral surface somewhat unequal, finely striate, striæ moderately coarsely punctate, punctures gradually finer to apex; intervals nearly flat, distinctly or slightly alternating in width and scarcely in convexity, very finely uniseriately punctulate. Pygidium coarsely punctate, hairs golden yellow, comparatively long, particularly about the apex where they extend beyond the lateral tufts.

Lower surface coarsely and densely foveate-punctate, nearly uniform at sides and middle, punctures largest, becoming confluent on the metasternum, also on last segment where they form a small fossa at apex; first and second abdominal segment divided by a faint sutural line. Legs long, finely sparsely punctate.

♂.—Metasternum and first abdominal segment feebly and narrowly concave at middle, second ventral very feebly. Pygidium feebly rounded at apex.

♀.—Metasternum nearly flat. Pygidium a little more distinctly rounded at apex.

Length, 9–11 mm., width, 3.5–4.4 mm.

New Orleans, La. (H. Soltau, R. W. Shufeldt); "Louisiana"; St. Lucie, Fla., and Savannah, Ga. (Hubbard and Schwarz); Texas (1 ex.)

Reared August, 1883, by Mr. Albert Koebele from larvæ found on the roots of pickerel-weed (*Pontederia cordata*) in July.

Type.—No. 7907, U. S. National Museum.

A single example, from New Orleans, has the punctured surface of the dorsum, a considerable portion of the lower surface of the thorax and small irregular areas on the abdomen coated with a shining ochreous integument like that of *æqualis*.

A very distinct species, showing no apparent affinity to any other form. From *venatus* or "*placidus*," with which it has been confounded in many collections, it may be distinguished by its naked body; long, cylindrical rostrum; with rounded apex; longer legs; more narrowed thorax; broader thoracic vitæ; divided apical fossa, and ventral punctuation as well as sexual characters. The tarsal structure is very similar to that of the *venatus* group.

PROCEEDINGS
OF THE
ENTOMOLOGICAL SOCIETY
OF WASHINGTON.

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JANUARY 12, 1905.

The 192d regular meeting was held at the residence of Mr. C. L. Marlatt, No. 1440 Massachusetts Avenue, N.W., President Banks in the chair and Messrs. Ashmead, Barber, Burke, Busck, Couden, Currie, Fairchild, Fiske, Girault, Hinds, Hopkins, Marlatt, Patten, Schwarz, Stiles, Ulke, and Webb, members, and Messrs. Brues, Hooker, Lantz, Nawa, Pierce, Sasser, and Sanders, visitors, present.

The president appointed, as the new publication committee, Messrs. Currie, Schwarz, Ashmead, Titus, Busck, Barber, and Heidemann.

Dr. H. G. Dyar was elected to represent the Entomological Society as a Vice-President of the Washington Academy of Sciences.

The treasurer presented his report to the society.

The resignations of Mr. T. Wayland Vaughan from active membership and of Prof. B. E. Fernow from corresponding membership were presented and accepted.

Mr. W. Dwight Pierce of the Bureau of Entomology, U. S. Department of Agriculture, was elected an active member of the Society.

The Annual Address of the retiring president was then read by the Recording Secretary:

ANNUAL ADDRESS OF THE PRESIDENT.

THE LINNÆAN GENERA OF DIPTERA.

By D. W. COQUILLETT.

To the systematic entomologist the writings of Linné possess an interest not shared by those of any other author. Coming at a time when pure science was being freed from fiction, he did yeoman service in the direction of placing the science of Natural History upon a firm foundation. This is particularly true in regard to the classification of natural history objects, and it is interesting to trace the evolution of this classification as given in the various authorized editions of his immortal *Systema Naturæ* and of his *Fauna Suecica*. Of the thirteen editions of the former work only five were issued by the consent and under the supervision of Linné himself; these are the first, second, sixth, tenth and twelfth editions. The other eight are reprints and usually abridged, the exception being the thirteenth edition, which contains considerable additional matter contributed by Gmelin, who edited it.

In the editions by Linné the various objects are divided into classes, orders, genera and species. The separation of the orders into families was at that time unknown.

The first edition of the *Systema Naturæ*, which appeared in the year 1735, treated the insects as class five and divided them into four orders; COLEOPTERA, which contained the Coleoptera as at present understood, together with the Orthopterous genus *Forficula*; ANGIOPTERA, comprising the Lepidoptera, Neuropteroid insects, Hymenoptera excepting the ants, Diptera and the Toredos; HEMIPTERA, comprising the Orthopterous genus *Gryllus*, the modern order Hemiptera, and the scorpions; finally the APTERA, which included all the wingless forms, now placed in four different orders, and some of the crustacea. The Diptera are comprised in the single genus *Musca*, which is briefly described, and under it are ranged, as species, *Musca* (different species not named), *Æstrum veterinum*, *Æstrum lapponicum*, *Tabanus*, *Culex*, *Tipula*, *Toredo navalis*, and the ant-lion.

In the second edition, published in 1740, the same four orders are recognized, but the name of one of them, Angioptera, is here changed to GYMNAPTERA. The Diptera are arranged as in the first edition except that only four species are listed, namely, *Musca*, *Tabanus*, *Culex* and *Æstrum*, while after each is given its vulgar or common German name.

The first edition of the *Fauna Succica* appeared in the year 1746. In this work no less than seven orders of insects are recognized, the names of four of them appearing for the first time, namely, NEUROPTERA, LEPIDOPTERA, HYMENOPTERA, and DIPTERA. The names, Angioptera, of the first edition of the *Systema Naturæ*, and Gymnaptera, of the second edition, are dropped entirely in the present work, while the other previously proposed names Coleoptera, Hemiptera, and Aptera, are retained, but in a restricted sense. In the Diptera the number of genera have increased from the one, given in the first and second editions of the *Systema*, to seven, namely; *Æstrus*, *Asilus*, *Hippobosca*, *Tabanus*, *Musca*, *Culex*, and *Tipula*. This work marks a very great advance in the matter of classification, especially in regard to genera and species. The genera are not described, but the species are characterized at considerable length, although not named specifically.

The next, or sixth, edition of the *Systema Naturæ* appeared in the year 1748, and is practically a repetition of the preceding work, but with the descriptions of the species omitted. The genera, however, are briefly described.

The tenth edition was published in 1758. Here the binomial system of nomenclature is given in its more perfected form, each species having a separate name. The orders are as in the sixth edition. In the Diptera three new genera are added, namely, *Empis*, *Conops*, and *Bombylius*.

The second and last edition of the *Fauna Succica* appeared in 1761; the orders in the insects and the genera in the Diptera are the same as given in the tenth edition of the *Systema Naturæ*.

The twelfth and last authorized edition of the *Systema Naturæ* was published in two parts; the insects are comprised in the second part, which bears the date of 1767. The orders and genera of the Diptera are the same as in the tenth edition.

It will thus be seen that two of these works mark very important epochs in the classification of insects; these are, the first edition of the *Fauna Suecica*, wherein the seven much more natural orders of insects are instituted and many new genera founded; and the tenth edition of the *Systema Naturæ*, in which the binomial system of nomenclature is placed upon a firm basis.

A few words in regard to the real name of this great naturalist may not be out of place. Students of his published writings have been sorely puzzled over the fact that whenever he had occasion to sign his name, whether in the dedication of the volume or at the end of the preface, he at first wrote his name Linnæus, but in his later works it appears as "von Linné." Historians inform us that the grandfather on the paternal side was a peasant by the name of Tiliander, and that his son, the father of the naturalist, in accordance with the custom then prevailing in Sweden, changed his name to Linnæus at the time he entered the University, and his son also used this name until the year 1761, when the King of Sweden issued to him a patent of nobility under the title of Carl von Linné—a curious admixture of German and French. It will thus be seen that Linnæus was not his academic or assumed name, as some have supposed, but was his legitimate name, inherited from his father, and that it was later changed to von Linné by royal decree.

Turning now from a consideration of one whose work comprised the entire realm of nature, it may not be out of place here to call attention to a recent important event in the history of an organization whose object has been to investigate only one of the numerous branches of Natural History. In view of the fact that the year just passed marks the twentieth anniversary of the founding of our Society, a brief retrospect of its history and work may be of some interest to the members and others interested in its welfare.

The Society took its inception on Friday evening, February 29th, 1884, in response to a call signed by Messrs. C. V. Riley, E. A. Schwarz, and L. O. Howard. At the following meeting,

held in the evening of March 12th, a constitution was adopted, officers were elected, and the names of twenty-six persons enrolled as charter members. Of these twenty-six original members, nine have passed into the great beyond, while eight of the others have since abandoned the study of Entomology, leaving only nine of the original twenty-six members still in the ranks, namely: Lawrence Bruner, T. L. Casey, Otto Heidemann, L. O. Howard, Albert Koebele, Theodore Pergande, E. A. Schwarz, J. B. Smith, and P. R. Uhler. It is fervently to be hoped that many years will pass by before this list will be lessened by a single name!

During the twenty-one years of its existence our Society has elected ten presidents, and while our constitution is silent on the subject it seems early to have become an unwritten law that the officers elected for any particular year were to be re-elected for the succeeding year. This rule was followed with a single exception; by an apparent oversight there is no recorded election of officers for the year 1897; those chosen for the previous year simply held their offices until their successors were elected and qualified. Up to and including the year above mentioned the presidents had held office for the prescribed two years each and had prepared an annual address at the close of each term, but during the following three years this rule was destined to be ruthlessly broken. The late lamented H. G. Hubbard was elected president of the Society for the year 1898, but ill-health prevented him from attending the meetings and preparing an annual address; he was re-elected president for the following year, but passed away before a month of the new year had elapsed. From the date of his demise on January 18th until the 16th of the following May the Society had no president, but at the latter date the first Vice-President, Doctor Theodore Gill, was elected president for the balance of the unexpired term. At the next annual election all of the officers were re-elected for the year 1900. During this year, as also the portion of the preceding one subsequent to the month of May, the Society was without a first vice-president. This break in the usual course of events resulted in our having two presidents during

the three years 1898-1900, while no annual address was delivered for either of these years. Each of the other presidents held office for two consecutive years, and one of them, Dr. Riley, the first president, was especially honored by the Society in that it elected him its president at four different times—an honor never since conferred upon any of its members.

During the twenty years of its existence our Society has published six volumes of its Proceedings; three of these appeared during the first eleven years, and the other three during the remaining nine years. These volumes are veritable storehouses of biological facts and also contain much matter of special interest to the student of systematic entomology, attesting the wide-awake interest and unremitting efforts of the members.

Mr. Fairchild exhibited a collection of photographic reproductions of the portraits of famous botanists, published by Prof. Wittrock of Sweden. He called especial attention to a series of portraits of Linné at different ages, the first one taken when about 30 years of age and ending with a copy of a reproduction in wax taken at an advanced age.

Mr. Schwarz, referring to Linnaeus, mentioned a published bibliography of the latter which is very little known or referred to. This is the one by Dr. C. A. Dohrn, President of the Entomological Society of Stettin, published in the Stettin Entomologische Zeitung.

Dr. Stiles spoke in favor of the formation by the Washington Entomological Society of a collection of photographs of its members. He believed that this should be begun at once, since it would soon be difficult, if not impossible, to secure photographs of the older members, and the collection would very soon come to be highly prized. After some discussion Dr. Stiles's suggestion in the form of a motion was seconded and carried.

--Dr Hopkins read the following paper:

NOTES ON SOME MEXICAN SCOLYTIDÆ, WITH DESCRIPTIONS OF SOME NEW SPECIES.

BY A. D. HOPKINS.

(In Charge of Forest Insect Investigations,
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Chapuis (1869), Eichhoff (1868-'79), and Blandford (1885-1904), have described several hundred species of Scolytids from Central America and Mexico, but there has been comparatively little recorded regarding their habits. Recently some information has been contributed in this line in an article by Prof. A. L. Herrera (El Progreso de Mexico, June 8, 1903) on a bark beetle injuring the white mulberry, and by Dr. S. J. Bonansea (in a pamphlet entitled "Birds and Insects," published by the Agricultural Society of Mexico, 1904), in which reference is made to extensive depredations by bark beetles on the pine forests in different sections of Mexico. The references to Scolytidæ in both of these papers were based on preliminary identifications of species sent to the Bureau of Entomology by the authors. Considerable additional Mexican material has been received from Prof. Herrera, Dr. Bonansea, and Mr. E. Baumann. In response to a request from Dr. Bonansea for names and descriptions of new species, and further information in regard to the named ones, this paper is presented, in order that he may include them in his forthcoming report on investigations of the causes of dying timber in Mexico.

The Scolytidæ received from these gentlemen represent nine genera and sixteen species, of which ten appear to be undescribed. Descriptions of these, with notes on other species from Mexico and their allies in the United States, follow:

Platypus rugulosus Chap. Three females and one male, Michoacan, Mexico, in wood of "chocolate tree," received from Prof. Herrera. This is a common and widely distributed species in Central America and Mexico, and probably extends into the southern border of the United States. One specimen in our collection from California appears to be different although closely allied.

Platypus pini, n. sp. Male type, length 5 mm.; very elongate cylindrical, piceous; legs and antennæ lighter reddish. Head, prominent, nearly one-third as long and slightly broader than anterior width of prothorax; front broad, flat, opaque, pubescent and punctured, but the punctures are very shallow, of irregular size and often contiguous; the occiput

convex, with two broad, opaque, slightly impressed longitudinal spaces each side of a slightly elevated, smooth, shining median one, the remaining surface towards the eyes shining, sparsely punctured and with a few long, backward-curved hairs. Prothorax subopaque, as long as the basal width, narrower in front and deeply excavated in the sides for the anterior legs; distinctly punctured, denser each side of a faint, median, dorsal, smooth space and coarser near the anterior and posterior margins; posterior third with distinct impressed dorsal line; base bisinuate. Elytra, subopaque; base elevated and with a subacute margin; striae faintly impressed, narrow, shining, and with faint, shallow punctures; the interspaces subconvex, equally elevated towards the middle, not punctured except those on the sides, which have a row of very fine obscure ones; the declivity is darker, opaque, with shallow, shining punctures faintly evident; the third interspace is strongly elevated, carinate, with an acute apex and extending to the middle of the face of the declivity; five and seven are slightly elevated and acute but not extending much beyond the vertex; the apical process is divided into two distinct triangular teeth, outer one longer; the apex is deeply, obtusely emarginate; the first interspace is not distinctly tuberculate on the vertex.

♂ *Type*.—No. 7509 U. S. Nat. Mus., Chaleo, Mexico, October, 1903, in pine. Received from A. L. Herrera, under his number 873.

This is closely allied to a common (but undescribed) species which infests the pines in Arizona.

Gnathotrichus nitidifrons n. sp. Female type, length 2.8 mm.; elongate, cylindrical, brownish; head and ventral portion black; the legs reddish. Head broad, slightly convex, shining, and punctured each side of a broad smooth median space, which extends from the anterior margin to near the vertex; pubescence fine and sparse; eyes large, emarginate; antenna club with two nearly straight indistinct sutures on the anterior face and with a few scattering long hairs. Prothorax more than half as long as elytra; posterior two-thirds with sides parallel; anterior third with sides and anterior margin broadly rounded, the latter faintly roughened with broad serrations; anterior half sparsely pubescent, finely asperate, the asperities coarser towards anterior margin and much finer and denser towards the vertex and sides; posterior half glabrous, opaque, finely indistinctly punctured. Elytra glabrous, except on declivity, which bears a few long hairs; striae not impressed, indistinct, faintly punctured; interspaces flat, faintly rugose; declivity with interspaces one and two slightly impressed and with slight elevation armed with a row of minute granules each side towards the vertex, while towards apex interspace one is slightly elevated and the others flattened and faintly rugose; the sides are not strongly rounded but narrowed towards the apex, giving it a slightly produced appearance.

♀ *Type*.—No. 7510 U. S. Nat. Mus., Michoacan, Mexico, in pine, Prof. A. L. Herrera, collector, bearing his number 1047.

This is allied to the common Eastern United States species *G. materiarius* Fitch, which infests the wood of pines from Maine to Florida and Texas, and *Picea* from Maine to the higher mountains of North Carolina. The Mexican species is distinct from *materiarius* by the broad, smooth, shining frontal space and the much more distinctly produced apex of the elytra.

Gnathotrichus sulcatus Lec. One specimen, Chaleo, Mexico, October, 1903, received from Prof. Herrera under his number 872, and another specimen from Michoacan, in pine, under his number 1047. I fail to find characters of sufficient value to separate these specimens from *G. sulcatus* Lec., which I have found to be a good species and not the male of *G. retusus* Lec., as considered by LeConte (Proc. Amer. Philos. Soc. XV, p. 350). *G. sulcatus* is a common and widely distributed species in the Pacific Coast and Rocky Mountain regions. I have found it in *Pinus*, *Tsuga*, *Pseudotsuga*, *Abies*, *Picea*, *Thuja*, and *Sequoia*. Blandford evidently had specimens of this species, together with (as he himself suggests) representatives of one or two other species when he drew up his descriptions of *G. consentaneus*.

Pityophthorus chalcænsis n. sp. Female type, length 2.6 mm.; elongate-cylindrical, dark, ferruginous; sides of prothorax and legs lighter. Head broad, flat, rather coarsely, densely, rugosely punctured and with epistoma-like elevation on the anterior margin; the face with a few scattering hairs and the margin fringed with long incurved yellow ones; eyes emarginate; antennal club small and sutures impressed on sides and face. Prothorax one-half as long as elytra; sides nearly parallel to anterior third, then narrowed to margin which is broadly rounded; nearly smooth; anterior rugosities confused, extending towards side margin; posterior half shining, with median smooth longitudinal space; punctures coarser and denser towards dorsal space, fine and sparse on sides; pubescence fine, sparse, recumbent. Elytra twice as long as prothorax; pubescence fine and sparse towards base, denser and longer on declivity; striae punctures in approximate rows on sides, confused towards suture, side margin and declivity; second interspace broadly, deeply impressed; the sutural interspaces elevated and roughened with a row of numerous acute granules; the third interspace rather strongly elevated and armed with a row of six or seven small, acute piliferous, granules; striae one and two obscure.

♀ *Type*.—No. 7511 U. S. Nat. Mus., Chaleo, Mexico,

October, 1903, in pine, from A. L. Herrera, under his number 872.

This species is not closely allied to any known species north of Mexico, and apparently is quite different from any of the nineteen species recognized from Central America and Mexico by Blandford.

Pityophthorus herrerae n. sp. Female type, length 2.5 mm.; elongate, cylindrical, piceous. Head broad, flat, finely rugosely punctured; pubescent and fringed with long, yellow hairs; the anterior margin with a smooth shining triangular elevation; eyes emarginate; antennæ missing. Prothorax slightly more than half as long as elytra, slightly narrowed from base to anterior margin, which is broadly rounded, faintly roughened, but not serrate; anterior rugosities confused, extending toward side margin, where they are much finer; posterior half with distinct longitudinal space, broader towards base, not elevated; punctures rather coarse and dense, becoming very fine towards the sides, but without interstitial minute points; anterior half and sides with fine sparse pubescence; posterior dorsal surface glabrous. Elytra pubescent only towards side margin and on declivity; stria punctures irregular but in approximate rows the interspace towards the suture and side margin with an occasional puncture; declivity with sutural interspaces slightly elevated and roughened with a few small irregular granules; apex slightly produced; the second interspace broad, flat, shining; the third scarcely elevated, punctured, but without distinct granules; the first stria is close to the first interspace, faintly impressed and punctured; the second stria is close to the third interspace, distinctly punctured.

Male type, length 2.55 mm.; differs from the female in the glabrous, shining, evenly punctured front, with strongly elevated, smooth, shining posterior margin, and a faintly elevated, shining lateral margin; antennæ yellowish-red, club with two slightly curved sutures, basal joint glabrous, shining; prothorax with anterior rugosities coarser; posterior half with broader dorsal space; elytra pubescent only along sides towards the margin, pubescence denser and longer on the sides of the declivity, but the vertex and face of the declivity are glabrous; the sutural and third interspaces more distinctly elevated and roughened with coarser granules.

♀ *Type*.—No. 7512 U. S. Nat. Mus., Mexico, from A. L. Herrera, under his number 696.

♂ *Type*.—No. 7512 U. S. Nat. Mus., from A. L. Herrera, under his number 694. One additional female with number 696 is smaller, 2.25 mm., but agrees exactly in other characters.

This appears to come close to *P. confusus*, Bland., but differs in the smooth punctation of the prothorax instead of "interstitial punctation of minute points" mentioned in the description of *confusus*.

Tomicus mexicanus n. sp. Female type, length 4.8 mm.; elongate, cylindrical, ferruginous, clothed with long fine hairs; declivity of elytra excavated and armed each side with three teeth, the first very small, acute—the second triangular, acute—the third widely separated, long, cylindrical and thickened toward tip. Head, front flat, subopaque, densely granulated with shining median impression and a small shining tubercle on the anterior margin; antennal club with two obscure, broadly curved sutures on the anterior face; the posterior face pubescent and with one indistinct broadly curved suture. Prothorax as broad as long; anterior two-thirds roughened with small asperities, becoming finer towards the sides; posterior third smooth, punctured, with narrow dorsal longitudinal space. Elytral punctures coarse, those of the striae coarser and denser than those of the interspaces, first to fourth in distinct row, but the punctures on the sides are densely confused.

Male type, length 5 mm., same form and general characters as the female, except that the pubescence is less dense; the frontal impression deeper and opaque, the marginal tubercle more prominent, and the margin more distinctly granulated; the teeth of the declivity distinctly coarser, especially the first and second.

♀ and ♂ Types.—No. 7513 U. S. Nat. Mus., Mexico City, Mexico, 1903, in firewood, Prof. A. L. Herrera, collector, and bearing his number 865.

Two additional males from the same lot are of the same size and color of the female type, and agree exactly with the secondary sexual characters in the male.

This is evidently the species mentioned by Blandford (Biol. Centr. Amer., Vol. IV, Part 6, page 188), on the authority of Eichhoff, under *T. concinnus* Mann. It is, however, easily distinguished from specimens I have identified as *concinnus* by its reddish color and very much coarser puncture of the elytra and prothorax. Blandford compared his specimens with one from California, which, although closely allied to *concinnus*, evidently represents an undescribed species. *T. concinnus* is a boreal form extending down the coast into the United States with the Sitka spruce, in which it lives, while the California species is common in *Pinus radiata* in middle California and *Pinus murrayana* of the higher Sierras and extending, with this tree, as far north as Priest Lake, Idaho.

Tomicus integer Eichh. The specimens in our collection from Mexico received from Mr. Blandford under *T. plastographus* belong, without doubt, to *T. integer* Eichh., which is a good species, distinct from *T. plastographus* Lec., with which it has been confused. The type specimen of the latter which I have examined agrees with specimens from Monterey pine in California, but LeConte made the mistake in this, as he

did in many other cases, of including in his revision in the *Rhynchophora* characters of specimens other than the original type or types. There was only one specimen on which the original description was based, but in LeConte's revision a specimen from New Mexico was included which proves to be *T. integer* Eichh.

I have found *T. integer* to be a very common species throughout the Rocky Mountain region, from Montana east to the Black Hills of South Dakota, and south to New Mexico and Arizona, from which it extends into Mexico. It infests *Pinus ponderosa* and *Pinus monticola*, but no evidence has been found that it is a primarily destructive enemy. *T. plastographus* Lec., seems to be confined entirely to the sections in California where *P. radiata* grows.

Tomicus bonansea n. sp. Female type, length 3.35 mm.; elongate cylindrical, dark reddish-brown. Prothorax slightly darker; declivity of elytra excavated and armed each side with four short acute teeth, the first smaller, and the second to fourth nearly of equal size, but the second and third are closer together and situated on a slight elevation of the margin. Head flat, opaque, densely granulated, clothed with short erect pubescence and with fine median elevated line from middle to anterior margin; antennae missing. Prothorax as long as broad, sparsely pubescent towards sides to anterior margin; posterior half rather coarsely sparsely punctured, with smooth, shining dorsal space; sides parallel to anterior third, then strongly narrowed to apex. Elytra less than twice as long as prothorax, with short sparse pubescence towards the side margin and declivity; striae faintly impressed, punctures distinct and closely placed, slightly coarser towards the middle; interspace one narrow, two and three broad, flat and not punctured towards base, fourth to ninth sparsely punctured.

Male type, length 3.35 mm.; yellowish-red (young example), differs from female in the narrower, more convex and more shining front, with the granules and punctures less distinct and with a more prominent subcarinate tubercle towards the middle; prothoracic punctures finer and less dense. Elytral striae and interspaces the same, but the teeth of the declivity are much coarser—the first and fourth of equal size, acute; the second stout, triangular, with acute point at right angles to the third tooth, which is cylindrical, prominent and enlarged towards the apex. The antennal club is slightly oblong, with two sutures on the anterior face; the first straight and the second bisinuate, and posterior face is glabrous, shining, and without sutures.

♀ Type.—No. 7514 U. S. Nat. Mus., Tacubaya, Mexico, in pine, Dr. S. J. Bonansea collector, bearing his number 2.

♂ Type.—No. 7514 U. S. Nat. Mus., Prof. A. L. Herrera, collector, bearing his number 694.

This species belongs to the *T. pini* division of the genus, characterized by four marginal teeth on each side of the elytral declivity. Evidently it was not represented in material seen by Eichhoff and Blandford. It is readily recognized from *Tomicus integer* Eichh., by its much smaller size, and from *T. oregoni* Eichh. and other allied North American species, which might find their way into Mexico, by its more slender form.

Tomicus cribripennis Eichh. Four females and four males, Mexico, in pine, received from Dr. Bonansea. This species is a representative of the section of the genus characterized by five teeth on the side margin of the elytral declivity, and also with the interspaces of the elytra punctured. This section is represented in the United States by *Tomicus confusus* Lec., which I have found to be a common and sometimes destructive enemy of the piñon (*P. edulis* in Arizona, and *P. monophylla* in Southern California); also by an undescribed species from Idaho and Montana, in *Pinus monticola*.

The Mexican species differs from *T. grandicollis* Eichh. of the Eastern United States (which also has five teeth on the declivity) in the distinct punctures of the elytral interspaces. Blandford states that the specimens seen by him differ from the type in being smaller and less robust, which is the difference from *confusus* observed in the specimens before me.

Phlæophthorus moriperda n. sp. Female type, length 1.65 mm.; stout, cylindrical, reddish-brown; head, prothorax and ventral surface darker. Elytra, legs and antennal scape reddish. Head subconvex, subopaque, finely granulated and with very fine, short, sparse pubescence, and with a fine, median longitudinal elevated line on the slightly flattened and more shining anterior half; eyes oblong, oval, not emarginate; antennal scape with a few long hairs; club large with three triangular segments separated by two impressed slightly oblique sutures. Prothorax one-third broader than long, one-half as long as elytra, slightly narrowed from base to front, the anterior margin not serrate; surface opaque, clothed with reclining, stout, yellow pubescence and roughened by sparsely placed granules, which are coarser towards the sides. Elytra shining, the base elevated and serrate; the side margins serrate from middle to apex; serrations much coarser on the side margins of the declivity; striae impressed; punctures distinct to vertex; interspaces faintly elevated and roughened with a row of asperities and each with a row of fine, yellowish hairs from base to apex; declivity convex; striae deep and narrow, but the punctures obscure; interspaces convex, and with a row of small acute granules.

Male type, length 1.85 mm.; same form and color as female but with the head narrower and deeply concave, shining; the sides elevated and

with an acute tubercle towards the base of the antenna and faint broken transverse ridge across the front between the tubercles; the anterior margin with a small shining apical tubercle; the scape of the antenna distinctly fringed; the granules of the interspaces of the declivity are coarser on the vertex and face.

♀ and ♂ Types.—No. 7515 U. S. Nat. Mus., Irapuato, Mexico, in white mulberry, H. Chambon collector, but received from Prof. Herrera.

Three females and two males of the same lot vary in length from 1.65 to 2.1 mm., but otherwise show very little variation from the types.

Three specimens were received through Dr. Erwin F. Smith, from Prof. Herrera, who, as stated in his published account, received them from Mr. Hipolite Chambon, with the statement that it had killed more than one thousand small white mulberry trees in Irapuato, Mexico. This species differs from any of those mentioned by Blandford under *Phlaeotribus*, but belongs to his division characterized by the club of the antenna, which is not twice as broad as long. This is a character common to the species of the well defined genus *Phlaeophthorus* which is represented in the United States by *P. frontalis* and its allies, and in Europe by *P. rhododactylus*. The Mexican species comes closer to our mulberry bark beetle *P. frontalis*, but is distinct from it by its smaller size, brown club of the antenna, the prothorax more opaque, smoother, and the elytra more shining.

Phlecosinus lacubaya n. sp. Female type, length 2.4 mm.; body stout, picuous, with elytral declivity more reddish; pubescence short, stout intermixed with scales on declivity. Head with front convex, finely granulate; granules becoming sparser towards middle; with fine carina from middle to anterior margin and finely densely punctured on vertex; eyes oblique, deeply emarginate; antennae missing, but in another specimen the club is oblong, with first and second sutures on anterior face nearly straight and the third strongly curved; the sutures are the same on the posterior face, but the first joint is very much shorter. Prothorax much broader than long; sides rounded from base to apex, faintly constricted towards anterior margin; surface shining, smooth, rather densely punctured, without dorsal line or space. Elytra twice as long as prothorax, and slightly broader; basal margin serrate, produced forward but not elevated; striae narrow, with contiguous elongate punctures; interspaces flat, irregularly rugose; declivity convex; first and third interspaces serrate; second narrow, convex, punctured.

Male type, length 2.4 mm.; differs from female in its narrower front, with a faint median impression and in the declivity of the elytra, which is more shining and less pubescent.

♀ and ♂ *Types*.—No. 7516 U. S. Nat. Mus., Tacubaya, D. F., Mexico, in Cupressus, E. Baumann collector, February, 1903.

One additional male and two females from same lot show no difference except that the front of the males has a much more distinct elevated line from middle to anterior margin.

This species and the following belong to the division of the genus characterized by a smooth second interspace of the elytral declivity of the females. The species of this genus infest *Juniperus*, *Cupressus*, *Chamaecyparis*, *Taxodium*, *Sequoia*, and their allies, and, under certain conditions, may be destructive.

Phloeosinus baumanni n. sp. Female type, length 3.5 mm.; body stout; prothorax, ventral surface and legs black, elytra more reddish; pubescence yellowish, short, dense on front of head and prothorax, sparse and in approximate rows on elytra; the declivity clothed with fine, short scales. Head, front convex, rugose, with faint impression and faint, elevated line from margin to vertex, slightly broken by impression; eyes oblong; antennal club large, oblong, with three oblique broadly curved sutures on anterior face and three nearly transverse curved ones on the posterior face. Prothorax, one-third broader than long, narrowed from base to apex; sides rounded, faintly constricted anteriorly; punctures dense, coarser towards sides. Elytra slightly more than twice as long as prothorax; base subacute, produced forward, slightly elevated and serrate; striae scarcely impressed but with very coarse distinctly separated punctures; the interspaces narrow, scarcely elevated but roughened with rather coarse transverse rugosities which often extend across the striae between the punctures; declivity convex, with interspaces one and three strongly elevated and closely serrate, the second interspace nearly flat and densely subrugosely punctured.

Male type, length 4.1 mm.; same color and form as female, except that the prothorax is narrower anteriorly; the front is narrow, flat or subconcave, with median elevated line from middle to anterior margin; the elytral interspaces are smoother and the striae punctures more distinct, the declivity steep, with the first interspace broad, flat, shining and irregularly punctured, with two or three teeth on the vertex; the first stria is distinct, strongly punctured and broadly curved towards the side, almost obscuring the second interspace and stria; the third interspace is prominently elevated and serrate, with coarse, closely placed teeth.

♀ and ♂ *Types*.—No. 7517 U. S. Nat. Mus., Tacubaya, D. F., Mexico, in Cupressus, E. Baumann collector, February, 1903.

Fifteen females and nine males in same lot vary in length from 3.9 mm. to 4.1 mm.—average about 4 mm.

Dendroctonus mexicanus n. sp. Female type, length 4 mm.; elongate, cylindrical, dark brown. Head broad, with two frontal elevations separated by a shallow median groove; anterior and posterior halves punctured; middle rugose from eyes to frontal elevation; antennal club broad, compressed towards tip, and with two broadly curved sutures. Prothorax nearly as long as broad, slightly narrowed from base to anterior margin, which is sinuate, the base declivous and bisinuate; punctures moderately coarse, becoming finer towards sides; anterior third with distinct transverse ridge extending across proepisternum. Elytra twice as long as prothorax; sides parallel; base obliquely serrate; interspaces roughened with asperities, which are coarser towards base and vertex; the first interspace with a row of coarser asperities from near base to vertex; declivity subconvex, sparsely clothed with long erect hairs which also extend to near the middle of the elytra; the striae narrow, punctures obscure; interspaces flattened and roughened with irregular granules.

Male type, length 4 mm.; differs from female in the more prominent tuberculate frontal elevations separated by a deeper groove. Prothorax with transverse ridge across the anterior third less distinct than in the female and not extending across the proepisternum. Elytra with deeper striae and more convex interspaces.

♀ and ♂ Types.—No. 7518 U. S. Nat. Mus., Sacramento, Amecameca, Mexico, in pine, A. L. Herrera collector.

Twenty-five females and eleven males received at different times from A. L. Herrera and Dr. S. J. Bonansea, from Amecameca, Michoacan and Tacubaya, Mexico, vary in length from 3 mm. to 4 mm. average about 3.8 mm.

The characters described in the types are fairly constant in all the specimens, but the submarginal ridge is more distinct in some females than in others, and, while present in some males, it is obscure or absent in others.

This species belongs to the division of the genus characterized by more prominent frontal tubercles in the male and a transverse ridge near the anterior margin of the prothorax of the female. It finds its nearest ally in *D. parallelocollis* Chap. of Mexico, and *D. frontalis* Zimm. of the Eastern and Southern States. It is, however, easily separated from *parallelocollis* by the uniform smaller size and more brownish color, and is distinct from *D. frontalis*, with which the smaller examples agree in color and size, by the much longer and coarser hairs of the elytral declivity, the rugosities coarser towards the base and declivity, and a row of coarse granules on the first elytral interspace. This is evidently the species most to blame for the destruction of the pine forests in Mexico, and evidently has habits very similar to that of *D. frontalis*, which devastated the pine and spruce forests of the Virginias in 1891 and 1892,

as described in Bulletin No. 56, West Virginia Agricultural Experiment Station.

Dendroctonus parallelocollis Chap. Ten specimens received from Prof. Herrera, taken from dying pine trees in Michoacan and other localities in Mexico. This is evidently the same as *D. approximatus* Dietz, which name is more recent, but may be used for the variety found as a common enemy of the pine in Arizona and New Mexico. Specimens of this variety are distinguished from those before me from Mexico only by the much shorter pubescence and hairs on the sides of the prothorax towards and on the basal angle. All the species of *Dendroctonus* are exceedingly variable, and when a large series of specimens of allied forms are examined it is very difficult to separate them by any constant characters.

Dendroctonus valens Lec. Four specimens, Michoacan, Mexico in pine, received from Prof. Herrera. These are typical examples of the large red *Dendroctonus* heretofore identified as *D. terebrans* Oliv., which latter is a black form restricted to the Eastern and Southern United States, while *D. valens* is widely distributed over the Eastern as well as the Western United States and is a common enemy of all of the pines, and occasionally found in spruce. It breeds in the living bark at the base of healthy trees or that of stumps of recently felled ones. I have found that a large per cent. of the so-called basal fire wounds of the Western yellow pine is primarily due to the work of this species. Very little evidence has been found, however, of trees having been killed by it.

Hylurgops planirostris Chap. One specimen, Mexico City, 1903, in firewood, received from Prof. Herrera, under his number 865. This species was recorded by Blandford from several localities in Mexico and Guatemala. It is, as he says, allied to *H. rugipennis* Mann., which I have found to be common in *Picea*, *Pinus* and occasionally in *Abies* and *Pseudotsuga* from Northwestern Washington to the Black Hills of South Dakota, and south to Monterey, California and Williams, Arizona. The Mexican species is easily separated from *rugipennis*, however, by the obscure punctures and fine rugosities of the prothorax. Blandford included *H. planirostris* in the genus *Hylastes*, but it seems to me that *Hylurgops* is sufficiently characterized by the deeply bilobed third tarsal joint and other characters to justify retaining it for this and several European and American species.

Mr. Schwarz stated that the life-history of the remarkable Mexican Scolytid genus *Chapuisia* has been published by

Dr. Eugene Duges, and there may be other scattering notes on Mexican Scolytidæ. He suggested that the Scolytidæ collected at Brownsville, Texas, last summer by Mr. Barber be worked up and incorporated by Dr. Hopkins in his paper, since they were in reality Mexican Scolytid species.

—Mr. Barber, under the heading of Short Notes and Exhibition of Specimens, showed several original photographs of the work of the tube-forming termite (*Termes tubiformans*) at Brownsville, Texas, and described the termites' work. This species, by covering large areas of grass and herbage with its clay or earthen galleries, destroys and kills much of the pasturage and is thus of considerable economic importance. Each blade, stem or twig is completely incrustated and portions of the ground where these termites are abundant thus presents a very singular appearance.

Mr. Brues stated that *T. tubiformans* is common at Austin, Texas, and that it feeds there upon cow manure. Mr. Fairchild asked Mr. Schwarz whether any truly fungus-cultivating termites were known in this country. Mr. Schwarz replied that he did not know of the habit of fungus-cultivating in any of our species.

—Mr. Banks showed a small piece of limestone rock in which were many minute holes, each of which was occupied by a mite of the family Oribatidæ, genus Scutovertex. This was one of many spray-covered stones taken from the banks of a stream of water near Ithaca, N. Y. The mite appears to have no special peculiarities, but is a new species and closely related to one found on boulders between tide-marks on the northern Atlantic coast. Inasmuch as each mite, be it large or small, fits its hole, it seems evident that the holes are caused by the mites themselves; yet he could offer no explanation or supposition as to how this is done.

—Mr. Marlatt then introduced to the Society Mr. K. Nawa, of Gifu, Japan, and expressed for the latter his pleasure at being able to visit Washington and attend a meeting of the Entomological Society.

FEBRUARY 2, 1905.

The 193d regular meeting was held at the residence of Dr. L. O. Howard, 2026 Hillyer Place, N.W., Vice-President Hopkins in the chair and Messrs. Alwood, Ashmead, Barber, Benton, Burke, Cook, Currie, Doolittle, Dyar, Fairchild, Fiske, Girault, Hinds, Howard, Hunter, Marlatt, Morrill, Morris, Pierce, Quaintance, Schwarz, Scott, Titus, and Webb, members, and Messrs. Beattie, Crawford, Hooker, Norton, Rankin, Sanders, and Sasscer, visitors, present.

Dr. Dyar showed a specimen of the larva of *Castnia licus* Drury which has been received at the Bureau of Entomology as injurious to sugar cane in British Guiana, by boring in the stems. Very little is known about the larvæ of the Castnidæ except that they are borers. This has led some to infer that there is a relationship between them and the boring Hesperiidæ such as *Megathymus yuccæ*, but such should not be the case, as the venation is entirely different in these groups. The larva before us bears out this conclusion, as it is a true Tineoid form, not related to the Butterflies, but to the Cossidæ and Sesiidæ.

LARVA OF CASTNIA LICUS Drury.

BY HARRISON G. DYAR.

Larva. Head large, rounded, full, somewhat flattened, apex retracted in joint 2; clypeus small, shield-shaped, but with large paraclypeal pieces which touch the vertical membrane; antennæ very small, rudimentary, shorter than the palpi; ocelli, nearly obsolete, two small ones seen near the antennæ; brownish luteous, darker around the mouth, the mandibles and articulations black. Body robust, cylindrical; thorax enlarged, especially the dorsal parts of joints 3 and 4; joint 5 small, both dorsally and laterally; joints 6 to 10 about equal, 11 and 12 a little smaller. Spiracles large, narrowly elliptical, the one on joint 12 largest and directed obliquely backward. Thoracic feet very short, almost rudimentary, projecting laterally. Abdominal feet on joints 7 to 10 distinctly elevated but without the ordinary hooks. They are covered with numerous minute spicules, not in rows but in a large patch which narrowly runs across between the feet. These spicules are present also on the ventral side of joints 3 and 4 and dorsally on joints 3 to 11. On joints 7 to

10 dorsally they are placed in an elliptical, slightly raised area divided by a groove, so that the larva may almost be said to have feet on its back. No spines on joint 13. Shields reduced, the cervical shield large, scarcely chitinous except in a number of irregular brown patches; a slight linear thickening of the cuticle on the posterior edges of joints 3 and 4; anal flap large but uncornified. Skin smooth, yellowish white. unmarked. Tubercles very small, setæ minute. Arrangement normal for the Tineoidea without secondary hairs of any kind. On the thorax i and ii remotely approximate in pairs, iii very small, iv rather large, v below it, vi single on the leg base; on the abdomen i dorsad to ii, remote. ii opposite the edge of the spined area, iii above the spiracle, iv and v approximate, superposed on the upper subventral fold, vi posteriorly on the leg base, vii of three setæ on the anterior leg base, two of them weak and apparently sometimes absent, viii on the inner side of the leg.

—The Recording Secretary exhibited for Mr. A. N. Caudell a copy of the first volume of Kirby's *Synonymic Catalogue of Orthoptera*, containing the Forficulidæ, Hemimeridæ, Blattidæ, Mantidæ, and Phasmidæ, and presented for Mr. Caudell the following notes:

KIRBY'S CATALOGUE OF ORTHOPTERA.

By A. N. CAUDELL.

Through the kindness of the author I have just received from the British Museum a copy of the first volume of Kirby's *Synonymic Catalogue of Orthoptera*. This volume contains the families Forficulidæ, Hemimeridæ, Blattidæ, Mantidæ, and Phasmidæ. The saltatorial families will appear in a second volume.

The general arrangement of this catalogue is the same as that of the Neuroptera, Libellulidæ, Lepidoptera Heterocera, and Lepidoptera Rhaplocera by the same author. This catalogue forms a volume of over 500 pages, is well printed and well bound and the reputation of the author as an orthopterist is a guarantee of the excellency of the contents. However, as is invariably the case of any undertaking of considerable magnitude, there are certain omissions and errors that have crept in. I now desire to correct a few points that I believe to be erroneous, note a few omissions known to me, as well as to offer criticisms on a few points in which I am unable to agree with the author. With one or two exceptions the

following remarks apply only to genera or species found in our own country.

Labidura riparia Pall. The habitat of this species should include localities in the new world. The variety *erythrocephala*, however, is recorded from the West Indies and the author may refer all the new world specimens to that form.

Anisolabis annulipes Luc. *A. bormansi* Scudd., *azteca* Dohrn and probably also *antennata* Kirby should have been quoted as synonyms of this species. Bormans placed *antennata* as synonymous with *azteca*, *bormansi* was established as synonymous with *annulipes* by McNeill, and I have shown *azteca* and *bormansi* to be synonymous. However these are opinions and each worker is at liberty to follow his own belief.

Sphingolabis taeniata Dohrn. *S. linearis* Eschscholtz is quite certainly the same as this and has priority by some years and should take precedence.

Ischnoptera uhleriana Sauss. *I. unicolor* and *lithophila* of Scudder are both synonyms of *uhleriana*, so admitted by their describer.

Temnopteryx virginica Sauss. This is listed as distinct though it has been proved by breeding that it is the female of *Ischnoptera uhleriana*.

Phyllodromia Serv. Though Mr. Kirby knew this to be preoccupied he still uses it as valid, citing *Blattella* and *Liosilpha* as synonyms. This is done, however, as he wrote me, because of lack of time to determine whether *Liosilpha* or *Blattella* should be used in the place of it. The probability is that they may both be retained, depending upon whether or not *germanica* and *pumicata*, their respective types, are congeneric.

Phyllodromia germanica Linn. *Blatta obliquata* Dold. and *Ischnoptera bivittata* Thom. should be placed as synonyms of this species. Instead, the former is omitted altogether and the latter is listed as a distinct species.

Phyllodromia bivittata Serv. I very much doubt the distinctness of this species. It is certainly no more than a variety of *germanica*.

Phyllodromia borealis Sauss. This is, according to Blatchley, the female of *Isch. pennsylvanica* Deg.

Temnopteryx marginata Scudd. This species, which is also a synonym of *I. pennsylvanica*, is omitted from the catalogue.

Temnopteryx major Sauss. This belongs to the genus *Ischnoptera*.

Loboptera americana Scudd. The original reference is wrongly given, the correct citation being Proc. Davenport Acad. Nat. Sc., viii, p. 93, pl. ii, fig. 4 (1899).

Pelmatosilpha floridana Walk. Under this species, or at least in the same genus, should come the *Platyzosteira sabaliana* of Scudder, which Kirby locates in the genus *Eurycotis* as a synonym of Walker's *semipicta*. Having the types of both *floridana* and *semipicta* he should be able to properly place them, but Mr. Kirby is surely wrong in generically separating their supposed synonyms *ingens* and *sabaliana*, which are certainly congeneric if not synonymous.*

Tenodera sinensis Linn. This should have North America included in the habitat. It is the type of the newly established genus *Paratenodera*.

Mantis religiosa Linn. Like the above this should have North America included in the habitat.

Stagmomantis carolina Linn. *S. ferox* Sauss., *dimidiata* Sauss., *wheeleri* Thom., and *tolteca* Sauss. should be placed as synonyms of *carolina*.

Oligonyx scudderi Sauss. *O. bollianus* S. & Z., and *Mantis missouriensis* Glover are synonyms of this species. Instead the former is listed as distinct and the latter is omitted from the catalogue.

Thesprotia graminis Scudd. This is certainly not congeneric with *Oligonyx scudderi*, though here placed in the same genus with it.

Pseudosermyle Caud. Though I especially mentioned *P. banksi* as the type when I established this genus Mr. Kirby gives *arbuscula* as the type.

Timema Scudd. This remarkable genus is certainly worthy of subfamily distinction, but Mr. Kirby includes it in the Anisomorphinæ, making no reference to Timeminæ, the subfamily proposed for it.

Aplopus Gray. Kirby uses the amended spelling *Haplopus* and gives *jamaicensis* as the type. But the genus is monotypic, *micropterus* being the only species included under it at the time of its establishment. Therefore, *micropterus* and not *jamaicensis* is the type.

Mr. Kirby retains certain species as valid that I should consider as invalidated through preoccupation. Such, as an example, is *Phoraspis cossidea* Dalm., 1823, described as *Blatta cossidea* and, in my opinion, is preoccupied by *Monastria cossidea* Esch., 1822, also described in the genus *Blatta*.

Appended I give a list of genera and species of *Blattidæ* apparently not entered in the catalogue. All are described prior to 1896. Some of them may be entered under a misspell-

* Since the above was written, I have proved these forms synonymous by breeding.

ing, as, for example, *Mioblatta fornicata* Sauss., which is entered as *forficata*, throwing it alphabetically from its rightful position and rendering it not readily found in the index. The same is true of *Blatta adversa* Sauss. & Zehn., which is misspelled *advina*.

One paper by J. G. O. Tepper, Tr. Royal Soc., S. Austr., xix, 1895, is apparently unknown to the cataloguer, since none of the contents are entered. This paper contains one new genus and three new speices as follows:

Phyllodromia magna, page 19.

Paratemnopteryx zietzii, page 20.

Lepidophora n. gen., page 20.

Lepidophora furcata, page 21.

The following genera and species I cannot find in the catalogue, though they are apparently eligible to entry.

Blatta acutipennis Serv., Hist. Orth., 91 (1839).

Blatta abdomen-nigrum DeGeer, Hist. Ins., iii, 538, pl. xlv, fig. 5 (1773).

Blatta rufa DeGeer, id.

Epilampra conspicua Walk., Cat. Blatt. Brit. Mus., 67 (1868).

Hys Gistel, n. gen., Naturg. des Thierr., 137 (1848).

Hys cruentatus Gistel, id.

Blatta punctata Gistel, id.

Blatta decorata Serv., Hist. Orth., 99 (1839).

Pseudophyllodromia hystrix Sauss., Rev. Zool., xxi, 110 (1869).

Blatta incisa Walk., Cat. Blatt. Brit. Mus., 109 (1868).

Periplaneta parva Tepp., Tr. Royal Soc. S. Austr., xix, 162 (1895).

Periplaneta jungii Tepp., id.

Phyllodromica Fieber, Lotos, iii, 93 (1853).

Blatta pumila Stal, Eug. Resa, 309 (1858).

Epilampra rustica Stal, Öfv. Ak. Forh., xxxiv, No. 10, 34 (1877).

Heterogamia spinipes Fisch., Ent. de la Russ., iv, 74 (1846).

Heterogamia punctata Fisch. id.

Both *spinipes* and *punctata* are mentioned by Fieber, Lotos, iii, 95 (1853), as equaling *Blatta ægyptica* Linn.

Blatta lineolata Dalm., Anal. Ent., 87 (1823).

Macrophyllodromia Sauss. & Zehnt., Biol. Cent.-Amer., Orth., i, 46 (1893).

Temnopteryx marginata Scudd., Rept. U. S. Geol. Surv. Nebr., 251 (1872). This is a synonym of *Ischnoptera pennsylvanica*.

Blatta domicola ———, Risso Hist., v, 210 (———); Fieber, Lotos, iii, 94 (1853).

Blatta asellus Thunb., Mem. l'Acad. Imp. Sc. St. Petersb., x, 227 (1826).

Blatta cinerea Thunb., id., p. 277=*Blatta rufa* DeGeer.

Blatta cylindrica Thunb., id., p. 279.

Blatta gibba Thunb., id., p. 279.

Blatta limbata Thunb., id., p. 278.

Blatta papillosa Thunb., id., p. 275.

Some of these species of Thunberg's may not be blattids, but *B. cinerea* certainly is, for he refers to DeGeer's figure in the description.

The following species, all referred to before 1800 and after 1758, I do not find in the catalogue. Some of them may not be Blattidæ. All the references have been verified except those preceded by an asterisk.

Blatta alba Ström., Nye Saml. K. Danske Skrifter, ii, 66 (1783).

**Blatta anelytra* Schranck, Beytr. Naturg., 73 (1776).

**Blatta daurica* Beckm. Laxmann's Sibir. Briefe, 48 (1769).

**Blatta heteroceros* Licht., Cat. Rerum. Nat., iii, 95 (1796). (MS. name very probably.)

**Blatta ingens* Licht., Cat. Rerum Nat., iii, 95 (1796). (MS. name very probably.)

**Blatta longicornis* Licht., Cat. Rerum Nat., iii, 95 (1796). (MS. name very probably.)

Blatta longipalpi Fabr., Ent. Syst., Supp., 185 (1798).

Blatta palhiata Fabr., Ent. Syst., Supp., 186 (1798).

Blatta reticulata Fabr., Ent. Syst., Supp., 186 (1798).

Blatta obliquata Daldorf, Skr. Nat. Selsk., ii (2), 164 (1793). This according to the describer equals *Blatta germanica* Linn.

Blatta ocellata Gmelin, Linn. Syst. Nat., xiii, i, 2047 (1789).

Blatta punctulata Gmelin, id.

Ocellata and *punctulata* have the reference "Mus. Sesk., p. 47, Nos. 7 & 8.

Blatta ruficollis Fabr., Mant. Ins., i, 226 (1787).

**Blatta transfuga* Brünnich, in Pontoppidan's Kurzg. Nachr. Naturhist. Dannemark, 212 (1765).

Mr. Burke exhibited specimens, drawings and different stages in the work of the various insects which cause the "black check" of the western hemlock (*Tsuga heterophylla*). The primary injury is made by a member of the family Scolytidæ, the hemlock barkbeetle (*Hylesinus* sp.), while the real injury to the lumber is caused by a rat-tailed maggot, the

larva of the Syrphid fly *Cheilosia alaskensis* Hunter. This larva enters the wound made by the bark-beetle and causes the discoloration of the wood known as "black check." Mr. Burke showed, also, *Hylesinus granulatus* LeConte, which causes the primary injury to the lowland fir (*Abies grandis*), and another Syrphid fly, *Cheilosia hoodianus* Bigot, whose larva follows up the work of *H. granulatus* as does the larva of *Cheilosia alaskensis* that of the hemlock barkbeetle. Mr. Burke showed, further, *Syrphoctonus maculifrons* Cresson, an Ichneumonid parasite of both species of *Cheilosia*, and *Eutelus flavipes* Walker, another parasite of *Cheilosia alaskensis*, belonging to the family Pteromalidæ. In conclusion he exhibited specimens of the family Byrrhidæ, viz., *Amphicyrte simplicipes* Mann., found on resin masses exuding from fir and hemlock injured in the manner described, and *Simplocaria nitida* Mots., found on resin masses on injured hemlock. The exact relation of these two beetles to the *Cheilosia* and *Hylesinus* and their work is still undetermined.

Mr. Schwarz stated that the Byrrhid beetles live in moss and that their presence in resin is only accidental.

—Mr. Cook presented some notes on the habits of the kelep, or Guatemalan cotton-boll-weevil ant (*Ectatomma tuberculatum* Ol.). He found, in the case of this ant, that new colonies are formed by parties of workers from older communities and by transfer of a queen from the old to the new colony. When moving a colony, the workers first transfer the eggs, then the larvæ, then the cocoons. Then the queen is seized by her mandibles and carried over. In some ants belonging to this family (Poneridæ) the queens never have wings. In the kelep, however, wings are present, although they are probably never used. The keleps have no mating flight and the wings of queens are not bitten off regularly or promptly as are those of other ants. In view of these marked peculiarities of habit Mr. Cook affirmed his agreement with Dr. Ashmead that the Poneridæ are allied to the Dorylidæ and Mutillidæ rather than to the true ants which have an annual mating concourse.

—Dr. Morrill exhibited two specimens of the Mexican

flower beetle, *Euphoria basalis* G. & P., stating that he found the species on cotton blooms at Gomez Palacio, in the Laguna district of Northern Mexico, and at Cuernavaca. The beetle was very common at both places and to a certain extent injurious. He frequently found two beetles in a single cotton bloom, and in one case four. Published records show the occurrence of this beetle only in Mexico and there only in the plateau region—not in tropical portions, apparently. Dr. Morrill, however, called attention to the fact that Gomez Palacio has an elevation of only 2,700 feet, while Cuernavaca, seven degrees of latitude further south, is about 5,000 feet above sea level, thus showing that the species really has quite a geographical as well as vertical range. The specimen shown from Gomez Palacio is large, with dull yellow markings, and the hundreds of specimens observed at that place were of about the same size and color. The specimen from Cuernavaca, on the other hand, is smaller, with markings of a more intense yellow, and is typical of the many observed there. Dr. Morrill stated that there were fourteen specimens of this species in the National Museum collection all labelled "Mexico," without other information concerning locality. No two of these specimens are alike and they present gradations in color and size between the specimen from Gomez Palacio and the one from Cuernavaca.

—Mr. Fiske presented the following paper:

CATOGENUS RUFUS,

A Coleopterous Parasite.

By W. F. FISKE.

During the summer of 1903, a single specimen of this beetle was bred from the cocoon of a Hymenopterous (Braconid) parasite of the Elm Borer (*Saperda tridentata*), but subsequent examination of the cocoon failed to determine definitely whether the beetle had developed on the parasite itself or whether it had entered the empty cocoon and there pupated. The former theory was believed to be the true one, but could not be proven. During 1904 three specimens were bred under circumstances which cannot be construed otherwise than to amply confirm it.

April 13, 1904, a Cerambycid pupa of an unknown species (allied to *Goes*, and possibly *Goes oculata*) was found in a small chestnut which had died the previous summer.

On April 16 this was carefully examined and described, and on the following day, another careful examination discovered a very minute larva attached to the ventral surface of the abdomen, which was at first supposed to be that of a Hymenopterous parasite, but subsequently found to be Coleopterous. This larva, which was extremely minute and hardly visible without the aid of a lens, was believed to have hatched during the day intervening between the two examinations. It was attached by its head only (a faint dark colored spot soon appearing upon the body of the host at that point), and its body projected at an angle from that of its host.

For several days it remained in this position, increasing slowly in size, until the 19th, when it was found to have relaxed its hold, and was removed to a freshly pupated *Callidium aereum*, in the hope that the wound already inflicted on its host might not necessarily be fatal. Careful examination showed that this pupa was slightly wounded on one of its tarsi shortly after the introduction of the parasite, but the latter could not be observed to feed until May 8, when it was found to have moulted. The new host at this date was still alive, as was also the pupa upon which the parasite was originally found.

May 10 it was feeding freely and growing rapidly, and the new host appeared to be dead.

May 20 it had completely destroyed its host, and no trace of cast skin to indicate that it had moulted again could be found. It was then resting quiescent, and remained so until June 3, when it pupated. The pupa was entirely unchanged June 16, but July 3 was found to have produced a perfect *Catogenus rufus*.

On April 13, and on the same tree as that from which the above mentioned specimen was taken, a cocoon of one of the well-known parasites of the Cerambycidae, *Bracon dorsatus*, Say, was collected and placed under observation. July 5, on examination, a second specimen of *Catogenus rufus* was discovered, plainly visible through the parchment-like walls, and careful examination failed to discover any visible aperture by which any larva might have entered. This specimen was considerably below average size, while that bred from the Cerambycid pupa was, though much smaller than some specimens, about an average between the largest and the smallest.

A third specimen was afterward reared under still more interesting circumstances, and serves to confirm its life-history as above set forth.

April 26, 1904, a cocoon containing a larva of the same species of Hymenopterous parasite above mentioned was taken in the same tree from which the earlier collections were made, and placed in a breeding vial. June 3 the parasite was noted as having pupated, and very nearly reached maturity, but beside it, plainly visible through the transparent walls of the cocoon, was noticed a small white larva, supposed at that time to be that of a hyperparasite. This pupated soon after, and on July 9 was found to have just emerged; a very small specimen of *Catogenus rufus*.

The larva of the beetle appears, therefore, to be a true external parasite, its habits differing in no essential feature from those of many species of external Hymenopterous parasites.

The adult is fairly common throughout the South, and is found beneath the loose bark of recently dead and dying trees, both coniferous and deciduous. It occurs at nearly all seasons of the year, but is especially common during the late fall and early spring, and is found hibernating in situations similar to the above mentioned.

—Dr. Dyar then presented the following paper:

A FEW NOTES ON THE STRECKER COLLECTION.

BY HARRISON G. DYAR.

The Strecker collection is well preserved at Reading, Pa., just as Dr. Strecker left it. All the types are clearly marked and are without any admixture of foreign species. Dr. Strecker had an excellent eye for species and hardly ever redescribed anything that he had in his collection. The ascertainable synonyms, therefore, are not very many; I put a few on record here.

Family NOCTUIDÆ.

I could not form any judgment on most of the Noctuid types without being able to take them away for comparison with other collections. The species described under *Schinia* fall both into *Schinia* and *Lygranthæcia* on the character of the inner claws on the fore tibiæ as follows—*Lygranthæcia*: *imperspicua*, *dolosa*, *hanga*, *ultima*, *inclara*, *fastidiosa*, *nubila*, *siren*, and *lora*. *Schinia*: *lanul*, *obscurata*, *tanena*, *ar*, *labe*, *rubiginosa*, *approximata*, and *neglecta*.

Schinia ochrothæcia Smith is not a synonym of *lanul*, but an entirely distinct species; *velaris* Grote has also been referred to the synonymy, but I do not know about it.

Family THYATIRIDÆ.

Euthyatira tema Streck. (3183) is *E. semicircularis* Grt. (3181).

Family PLATYPTERYGIDÆ.

Dryopteris adona Streck. (3228) is a good species which I do not have, resembling *D. irrorata* Pack., but much larger, the fore wings without the prominence on outer margin, the hind wings long and somewhat produced.

Family GEOMETRIDÆ.

Tephroclystis golgata Streck. (3311) appears to be a *Glaucina* near *escaria* Grt. (3819). The fore tibia has a claw; but I was afraid to injure the type in looking for a fovea. It is a single ♀.

Philereme optimata Streck. (3346) is *Coryphista badiaria* Hy. Edw. (3339).

Hydriomene banavahrata Streck. (3397) is a varietal form of *H. californiata* Pack. (3391).

Hydriomene elisata Streck. (3415) is *Zenophleps lignicolorata* Pack. (3366) with a wrong locality label. It is marked "North Carolina" which I presume is a misreading of an abbreviated label that originally stood for "Northern California."

Petrophora anticostiata Streck. (3462) is *P. convallaria* Gn. (3460).

Macaria lapitaria Streck. (3683) appears to be the same as *Sciagraphia sublacteolaria* Hulst (3643).

Macaria teucaria Streck. (3684). I have the species from Seattle, Wash. (Johnson), Yosemite, Cal., June 16, 1891 (Dyar), and Sedalia, Col., June 15, 1901 (Dyar & Caudell). My California specimens are labelled *M. respersata* by Dr. Hulst, but I think it distinct therefrom by the different color.

Diastictis marinaria Streck. (3713). This is a faded specimen of *Eucrostis viridipennata* Hulst (3569). The species fades very easily and becomes quite uncharacteristic.

Apæcasia mercedulata Streck. (3756) appears to be a form of *Dcilinea falcataria* Pack. (3629).

Platea demorsaria Streck. (3775) is *Spodolepis substriaria* Hulst (3804).

Selidosema excelsarium Streck. (3840). A large and well marked species. I have it from Seattle, Wash., and Welling-ton, B. C. It has been correctly identified by Rev. Geo. W. Taylor.

Lychnosea runcinaria Streck. (3894) is only a variety of *L. helviolaria* Hulst (3892) with the edge scarcely empurpled.

Therina fautaria Streck. (3905) is *T. endropiaria* G. & R. (3908), worn and with the lines unusually approximate. I have such a specimen from Maine.

Euchlæna amethystaria Streck. (3959). I cannot separate it from *Gonodontis hypochraria* H.-S. (3941).

Priocycla jucundaria Streck. (3992) appears to me an aberrational form of *P. armantaria* H.-S. (3990).

Sabulodes nonangulata Streck. (4021) is probably only a variety of *S. caberata* Gn. (4020).

Family COCHLIDIIDÆ.

Kronæa minuta Reak. The types should be in the Strecker collection; a specimen of the European *Heterogenea asella* is so labelled, but of course incorrectly.

The following paper was then read by title:

DESCRIPTIONS OF NEW AMERICAN SPIDERS.

BY NATHAN BANKS.

In the following pages are descriptions of some sixteen new spiders from various parts of our country, most of them from the far West. They are presented now as I wish to have them in a catalogue of our spiders which is now about ready for publication. Among them are three genera new to the United States.

Modisimus texanus, n. sp.

Cephalothorax pale yellowish, with a broad, median, black stripe, tapering a little behind, eyes on black spots, but the middle of the eye-tubercle is pale, two black stripes from eyes down upon clypeus, and fainter on mandibles; legs pale, femora with from 6 to 12 brown marks below, near apex forming rings, the last preapical and broader than others, a mark over articulation of patella and tibia, and a preapical band on tibia brown. Sternum brown, pale in middle, abdomen pale, with many black and white spots above and behind, leaving a pale median stripe and a line each side; venter pale, with a median black dot. Eyes upon a considerable elevation, almost as high as length of mandibles; A. M. E. practically wanting. Legs very slender, femur i over four times as long as cephalothorax; abdomen high, subglobose, rather pointed at spinnerets; epigynum projecting forward in a sharp point.

Length 2.7 mm.

Austin, Texas, March, kindly given me by Prof. J. H. Comstock.

Avicularia californica n. sp.

Cephalothorax densely clothed with yellowish-gray hair, rather paler on sides and brighter in the middle; on anterior margin is a fringe overhanging the mandibles of long, pale gray hairs with tawny tips; eye tubercle with some long, partly recurved, bristles on middle. their bases tawny, and their tips pale. The mandibles are densely clothed above, with yellowish-gray appressed hair, and long, procurved bristles, whose bases are tawny, and tips pale. Sternum and coxæ black, with short fine grayish hair, and long, erect, partly tawny bristles. Legs densely clothed with yellowish-gray hair, and long, procurved bristles, except above on the femora, where there are only a few bristles near tip; the under sides of the legs are darker than upper side; and there is a dense black scopula beneath metatarsi and tarsi; there are two or three spines beneath on metatarsus iv toward base. Abdomen clothed above with fine dark brown hair, and many long, recurved bristles of a tawny color with pale tips; venter black-haired, and with long tawny bristles, especially noticeable on the posterior sides. Maxillæ and fang-grooves with long tawny bristles.

Length of cephalothorax, 28 mm.; width 16 mm.

Several specimens from the vicinity of San Diego, California.

Cybæus minutus n. sp.

Entirely dull yellowish, the cephalothorax and legs rather brighter than the abdomen; eyes on black spots. Cephalothorax not very slender; posterior eye-row a trifle recurved, P. M. E. more than diameter apart, and scarcely farther from equal P. S. E., anterior eye-row almost recurved; A. M. E. small, and about diameter apart, and closer to larger A. S. E., S. E. separate by radius; quadrangle of M. E. much narrower in front. Mandibles not strongly geniculate. Legs of moderate length, 4-4 spines under tibiæ i and ii; sternum rather broad; metatarsi i not scopulate. Abdomen short and broad; epigynum reddish, swollen, showing beneath a cavity in each posterior side.

Length 3.5 mm.

One female from Olympia, Washington. Distinguished by small size, and pale color.

Argyrodes pluto n. sp.

Deep jet black, except a few glittering patches of yellowish near summit of abdomen; an oblique spot each side, two transverse dots above before apex, and a semicircle partly around apex. Abdomen higher than long, not projecting beyond spinnerets, but very high directly over spinnerets and ending in a rather sharp point, the posterior margin (seen from side) and the dorsal margin slightly convex. The abdomen (seen from above) is rather broad in middle, more so than in most species. The first legs are long, but scarcely as long proportionately as in *A. trigonum*.

Length 4 mm.; abdomen high, 2.8 mm. tibia i, 2 mm.

One female taken near Falls Church, Va., 23 June, 1904, in web of a *Lathrodectes mactans*; *A. trigonum* in the same web. It is our largest eastern species of the genus, and very distinct by nearly uniform black color.

Dipæna tibialis n. sp.

Cephalothorax blackish, black on eye region; mandibles and palpi pale yellowish; legs reddish-yellow, anterior femora very bright, patella and tibiae i and ii all black, as well as tip of metatarsi i and ii, tibiae and metatarsi iv black on tips; sternum black; abdomen dull black above and below. Cephalothorax slender, eye region very high and projecting over the concave clypeus. P. M. E. less than diameter apart, plainly farther from nearly equal P. S. E.; A. M. E. slightly larger than P. M. E., and about two diameters apart, much closer to the slightly smaller A. S. E. Palpi heavy. Legs rather short; abdomen oblong-elliptical, the broad tip extending much beyond spinnerets.

Length 3.5 mm.

Two females from Olympia, Washington. Readily known by contrasting colors of the legs.

Crustulina pallipes n. sp.

Cephalothorax and sternum dark red-brown, abdomen dark brown above, almost black beneath, spinnerets pale, and sometimes a pale dot each side of them; legs pale yellowish or reddish-yellow. Cephalothorax short and broad, elevated in eye region; P. M. E. about diameter apart, and as far from the barely equal P. S. E.; A. M. E. scarcely as large as P. M. E., fully diameter apart, and closer to A. S. E.; quadrangle of M. E. rather broader behind than in front, and a little broader than high; clypeus concave; mandibles slender, longer than height of clypeus; sternum barely longer than broad, and broadly rounded or almost truncate between the hind coxæ, its surface is scabrous. Legs slender, but rather short, first pair but little longer than fourth, all rather heavily clothed with hairs and bristles. Abdomen very broad, sometimes fully as broad or broader than long.

Length 2.2 mm.

Several females from Olympia, Washington (Kincaid).

Gonglydium kincaidi n. sp.

Cephalothorax yellow-brown, black around eyes, a black marginal seam, and a black median line; legs and mandibles pale yellowish, sternum darker brown; abdomen black above and below; on dorsum there is a submedian row each side of five transverse white marks, nearly touching each other and the apical pair connected. Cephalothorax rather broad, head scarcely elevated; P. M. E. one and one-half diameter apart, and as far from the equal P. S. E., A. M. E. small and close together.

Mandibles unarmed; male palpi short and small; sternum triangular, very broad, pointed behind; abdomen rather short and broad, not flattened; legs moderately slender, without spines, tarsi i fully three-fourths of metatarsi i.

Length 1.5 mm.

One male from Olympia, Washington (Kincaid).

Exechophysis nigriceps n. sp.

Cephalothorax yellow, head black, clypeus lighter, dorsum of abdomen with a reddish shield, with black hairs, venter dark gray, sternum yellow-brown, darker on edges; femora, patellæ and tibiæ brownish, other joints yellowish, spinnerets pale. Head elevated and projecting forward, short stiff hairs on anterior part of elevation; posterior row of eyes nearly straight, anterior row a little procurved, the A. M. E. much smaller and closer together than the P. M. E. Hind legs much the longest, no spines above on tibiæ, but some stiff bristles below on tibiæ and metatarsi; sternum broad, triangular, projecting between the hind coxæ on the venter near spinnerets is a curved transverse line which looks like a furrow.

Length ♂ 1.3 mm.

One ♂ from a swamp near Ithaca, N. Y., in May. A ♀ from Sea Cliff, N. Y., which is possibly this species, has the eyes similar, the head elevated and swollen in front, there is no shield on the abdomen, the whole color paler, the head, however, is black, the legs white and more slender than in the ♂.

Exechophysis palustris n. sp.

Cephalothorax yellow-brown, darker around head; abdomen blackish (a little discolored); palpi quite dark; legs bright yellow; venter dark gray; sternum yellow-brown, darker on edges; spinnerets pale. There is a hard shield covering the dorsum of abdomen; the head is much narrower and more pointed than in *E. nigriceps*; the palpi are quite different from that species, the tibial joint being greatly enlarged; otherwise it is very similar to *E. nigriceps*.

Length 1.5 mm.

Two males from Ellis Hollow Swamp, and Fall Creek, Ithaca, N. Y., in May.

Linyphia bicolor n. sp.

Cephalothorax reddish-yellow; eyes on one large black spot; legs reddish-yellow on basal part, brownish toward tips; mandibles reddish; sternum black; maxillæ black on basal outer side, the inner apex yellowish; abdomen black above and below; cephalothorax broad behind, narrow in front; posterior eye-row barely recurved, P. M. E. one and one-half diameter apart, and two and one-half diameters from the equal P. S. E.; A. M. E. projecting forward, more than diameter apart, and twice as

far from the equal A. S. E.; the S. E. on a slight eminence, and barely separate; quadrangle of M. E. higher than broad, and nearly as broad in front as behind. Mandibles strongly convex in front, not very long. Abdomen in female subglobose, in male elliptical. Legs rather short, in female with few spines, more in male, especially on tibia i.

Length, ♀, 4 mm., ♂, 3 mm.

Olympia, Washington. Distinguished by contrast of color of maxillæ, as well as by other characters.

Bathyphantes pacifica n. sp.

Cephalothorax reddish-yellow, a black marginal seam, sometimes a black median line, and the eyes on black spots; mandibles reddish, often showing an oblique blackish mark; sternum blackish; legs pale yellowish, coxæ, patellæ, and tibiæ narrowly black at tips beneath; abdomen pale above, with a median black herring-bone stripe, blackish sides, and venter, latter with a pale line each side and three large pale spots on base, one on each lung-plate, and one between them; sometimes the median stripe of dorsum is connected for a greater part of its length to the dark sides. Of the usual structure of genus; P. M. E. more than their diameter apart, and nearly as close to the equal P. S. E.; a small tooth in front on each mandible; legs not very long.

Length 2 mm.

Several specimens from Olympia, Washington.

Tmeticus armatus n. sp.

Cephalothorax reddish; mandibles similar, but paler on tips; legs reddish-yellow, paler toward tips; sternum reddish. Abdomen uniform brown above and below. Head elevated; posterior eye-row slightly procurved; P. M. E. about diameter apart, and plainly farther from equal P. S. E., the latter touching the equal A. S. E.; A. M. E. smaller than other eyes, and very close together, more than two diameters from the A. S. E.; quadrangle of M. E. much broader behind than in front, and much longer than broad. Legs rather slender, with many fine hairs, no spines; femur i as long as cephalothorax; legs i and iv subequal; tarsi much shorter than metatarsi; tibia i longer than metatarsus i. Mandibles of male each with a large, curved, pointed process on upper part in front, and below on inner side one rather slender tooth, and several minute ones in vicinity. Sternum triangular, produced behind between hind coxæ in a fine point. Abdomen elliptical.

Length, ♂, 5 mm.

One male from Manitoba, Canada. The trochanters of legs are very prominent; seen from above they are as long as broad.

Phidippus texanus n. sp.

Cephalothorax red-brown, black in eye-region, the reddish brown extends forward on sides up to A. M. E.; clypeus with a fringe of white hairs above mandibles; white hair over and between A. M. E., a tuft of

bristles in front of dorsal eyes, and a smaller tuft lower down behind A. S. E.; many long erect black hairs on cephalothorax; mandibles iridescent green in front, base clothed with golden scales; legs reddish brown to very dark, the tip of joints darker, and tibia i with black apical half; all, but more especially the front pair, clothed with long white hair below and on sides, and erect black hair above; sternum dark; venter pale, unmarked except a fine dusky median line on basal half; dorsum brown, pale on sides, with two oblique white bars, white at base, extending back each side, and two approximate dark stripes on apical half, rather farther forward separated by a narrow, but very distinct, white stripe, connected to a larger spot in front. In each dark stripe are two white dots, sometimes connected to the median white line. This mark resembles that figured for *P. albomaculatus* by Peckham.

Length 12 mm.

A few females from Brazos Co., Texas, Sept. Also sent me by Mr. Scheffer from Kansas.

Pellenes formosus n. sp.

Cephalothorax pale yellowish; eye-region black, clothed with short white hair, especially prominent as a crest over the first eye-row; a large triangular black spot in the middle behind, and a brown stripe on each side; clypeus with snow-white hair, mandibles white, with a large, black, basal spot; palpi pale, the tarsi black, but with some white hairs; legs pale; femur i black toward tip, especially on outer side, patella black on outer side, tibia with a brown streak each side; femur ii blackish on inner side, brown streaks on patella and tibia; femur iii with an oblique black mark on anterior basal part, patella with three black dashes in front, one basal, two apical, tip broad; tibia iii with two dark streaks in front; femur iv with a black apical mark, and a band at base and at apex of the tibia; all legs with much long white hair, a ridge under femur i of especially long hair, and more on outer side of tibia i; the three spines on inner side of tibia i are large and flattened, a similar spine on inner side of patella i. Sternum pale; venter pale, with three dark stripes; dorsum pale, a basal black band, and two brown stripes above, joined behind, and leaving a rather reddish area between them.

Length 5 mm.

One male from Yuma, Arizona, August.

Hyctia robusta n. sp.

Cephalothorax yellowish, eye-region blackish, thoracic part with some irregular streaks of blackish; some white hair around eyes, and dense long white hair in front on clypeus; a tuft of curved black bristles behind each lateral eye; legs pale yellowish, first pair rather reddish; mandibles reddish; palpi pale yellowish, with a black line each side, and clothed with long white hair; sternum pale yellowish; abdomen yellowish, with a dark indistinct stripe each side above, made up of brown streaks and

points; venter wholly pale. Structure similar to *H. pikei*, but more robust; cephalothorax rather broader; leg i heavy, 4-4 spines under tibia i, and one above base of first of inner series, one spine on inner side of patella i, and three in a transverse row near tip of femur i; hind metatarsi spined only at tip, and tibia iv with but one sub-basal and an apical pair below. Abdomen about four times as long as broad, truncate at base, with crest of hairs, sides sub-parallel.

Length 8.5 mm.

One female from Arizona (Townsend).

Plexippus vittatus, n. sp.

Cephalothorax pale yellowish brown, eye-region blackish, rather paler in middle, a row of about ten curved black bristles below side of eye region, much short white hair around eyes; clypeus pale yellowish brown, as also mandibles, palpi, and legs, on the under side of femur i near tip are two short transverse black bars; sternum and venter pale; dorsum of abdomen with a straight jet-black stripe each side from base to tip, and between them a broad stripe of white. The structure is similar to *P. paykulli* in many respects; leg i is plainly thicker than others, and rather long, there are 4-4 spines under tibia i and one above base of first of inner series, one on inner side of patella i, and five or six above toward tip of femur; tibiae and metatarsi iii and iv have long spines near base and middle as well as at tip. Abdomen about three times as long as broad.

Length 9 mm.

Female from Arizona (Townsend).

EXPLANATION OF PLATE II.

- Fig. 1.—*Gonglydium kincaidi*, male palpus.
 2.—*Bathyphantes pacifica*, male palpus.
 3.—*Bathyphantes pacifica*, male palpus.
 4.—*Exechophysis palustris*, male palpus.
 5.—*Hytia robusta*, vulva.
 6.—*Plexippus vittatus*, vulva.
 7.—*Gonglydium kincaidi*, male palpus.
 8.—*Exechophysis palustris*, head of male.
 9.—*Exechophysis palustris*, male palpus.
 10.—*Exechophysis nigriceps*, side view of male.
 11.—*Exechophysis nigriceps*, male palpus.
 12.—*Tmticus armatus*, male palpus and mandible.
 13.—*Pellenes jormosus*, patella iii of male.
 14.—*Pellenes jormosus*, male palpus.
 15.—*Crustulina pallipes*, vulva.
 16.—*Bathyphantes pacifica*, vulva.
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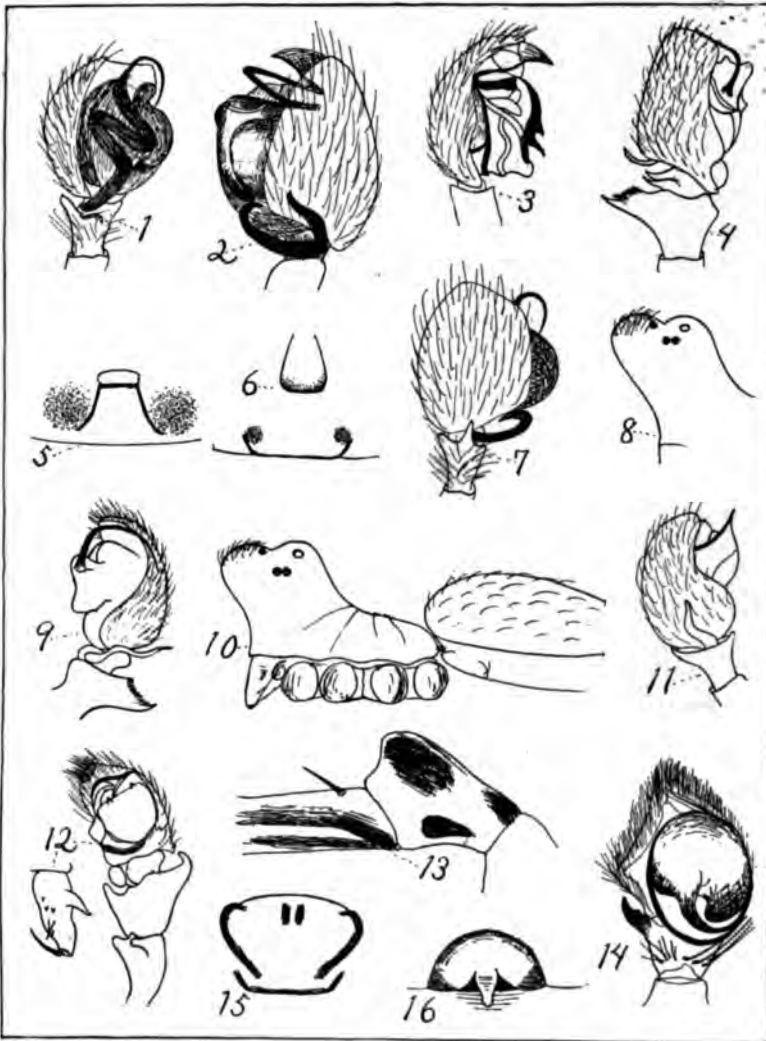


PLATE II.
NEW AMERICAN SPIDERS.

—Mr. Schwarz exhibited a box of *Theodosia* (*Helionica*) beetles from Mount Kina-Balu, North Borneo, and spoke on the genus and on the characters used for the distinction of species. The genus is one of the few Cetoniid genera that are armed in the male with one cephalic and one thoracic horn, thus resembling the well known genus *Dynastes* of another subfamily of the Scarabæidæ, viz, the Dynastinæ. With the exception of a single species the genus is peculiar to Borneo, and up to quite a recent date specimens were extremely rare in collections. Last year Messrs. Goss and Dodge donated to the National Museum a fine collection of Mount Kina-Balu insects, among which were no less than 359 male specimens of these *Theodosia* beetles. Mr. Schwarz finds that the most elementary and most readily observable character, viz, the sculpture of the upper side, is absolutely safe to separate one of the species, *T. westwoodii*, from the rest. There were 266 specimens of this species, which is always recognizable from the double punctuation of the thorax (smaller and larger punctures intermixed) and from the peculiar punctuation of the elytra (the punctures being imperfect and umbilicate, *i. e.*, there is a semicircle open behind), and with a small puncture in the center. The horns of this species show an enormous extent of variation as to length and curvature, but the cephalic horn is always simple, *i. e.*, not bifurcate. The second series of species is always characterized by uniformly dense granulation of the thorax and by the elytra not having any punctures at the surface. The substance of the elytra is transparent and the peculiar sculpture can easily be seen within the elytra, although the punctures do not reach the surface. Several species have been made of this set, and it is worth while to record the differences. *T. magnifica* Rothschild, represented by 69 specimens, has the cephalic horn simple; *T. telifera* Bates has, on the other hand, the cephalic horn bifid, but there is not the slightest other difference between the two forms, so that when, as frequently happens, the cephalic horns get broken off, the two forms cannot be distinguished. To make the matter more interesting, each of these two forms has a companion form distinguished at the first glance by a dense

fringe of yellow hair along the inner margin of the front tibia. Thus, *Theodosia perakensis* Moser has the cephalic horn simple, but the anterior tibia fimbriate, and *T. rothschildi* Janson has the cephalic horn bifid and the anterior tibia fimbriate. There are, again, no other differences to distinguish these forms, and it may be seriously questioned whether these four forms may be considered as distinct species. It may be added that dissections of all forms of Mount Kina-Balu *Theodosias* proved that the male parts are absolutely identical. Mr. Schwarz showed also the females, some 53 in number. Among these only one, or at most two, forms can be distinguished.

Dr. Dyar stated that the Lepidoptera from Mount Kina-Balu in the Goss and Dodge collection make a very fine showing. He experienced great difficulty in getting names for all the species, however, since Whitehead's work on the results of the explorations in Mount Kina-Balu lists only the new or rare species that were taken and is, therefore, of no assistance in determining the others.

Mr. Schwarz said that it is a common fault with writers of works on exploration that complete lists of the species collected are not given, only those species either new or rare being listed.

—Mr. Norton, upon the invitation of Dr. Howard, told of certain experimental work on dimorphism that is to be undertaken by Dr. C. B. Davenport under the auspices of the Carnegie Institution, at the Biological Station at Cold Spring Harbor, Long Island, N. Y. He stated that Prof. W. E. Castle has established, in the guinea pig, an experimental form of dimorphism which follows Mendel's Law, while he himself has found the same law to hold as regards certain plants upon which he has been experimenting. What is now to be investigated is, whether dimorphism in plants and animals, as occurring in nature, follows this law. An interesting object of experimentation is the common yellow swallow-tail butterfly (*Papilio turnus*), in which, in localities where the species is double-brooded, there are two forms in the female, one black and the other yellow. Extensive breeding experiments are to be undertaken to determine, if possible, whether the

production of these two forms follows Mendel's Law and also to ascertain which form constitutes the dominant type in the species. As all the males are ostensibly yellow, the problem is a difficult one, since, if this law holds with this species, some of the yellow males must be potentially black and produce offspring in which the black type prevails.

Mr. Cook said he did not believe that dimorphism in nature follows the working of any law. The matter was further discussed by the members present.

MARCH 2, 1905.

The 194th regular meeting was held at the residence of Messrs. A. L. Quaintance and W. M. Scott, 1809 24th St., N.W., President Banks in the chair and Messrs. Ashmead, Burke, Gill, Girault, Hinds, Hopkins, Howard, Pratt, Quaintance, Scott, and Webb, members, and Messrs. Davis, Johnson, Strauss, and McClendon, visitors, present. In the absence of the secretary Mr. Pratt was appointed secretary *pro tem*. Prof. Thomas B. Symons, Entomologist of the Maryland Agric. College Exp. Station was elected an active member. The acting secretary read a letter from Prof. J. B. Smith relative to a National Association of Entomologists; this was discussed by Messrs. Ashmead, Banks, Gill, Hopkins and Quaintance. The matter was referred to the following committee appointed by the President at the request of the Society, Messrs. Ashmead, Titus and Quaintance.

Mr. Webb exhibited specimens of two species of *Desmocerus* and presented the following paper:

**DESCRIPTION OF A NEW SPECIES OF DESMOCERUS WITH
A SYNOPTIC TABLE OF THE GENUS.**

BY J. L. WEBB.

Desmocerus piperi n. sp.

♀ ---Length 20.5 mm. Head, prothorax, ventral surface, legs, and antennæ bluish black; elytra bluish green, with narrow orange margins. Body elongate; head scarcely as long as prothorax, narrowed towards base; prothorax narrower than elytra, and strongly narrowed towards head, with an

obtuse elevation midway on each side, basal angles produced into spines; elytra scarcely narrowed posteriorly, posterior margin rounded with apices sub-acute.

♂.—Length 18.8 mm. Elytra distinctly narrowed posteriorly, and uniformly dull orange colored in pinned specimens (bright orange-red when living).

♀ and ♂ type No. 8401, U. S. N. M.; ♂ Blue Mts., Wash., July, 1896. Collector, C. V. Piper. The specimens before me, 15 in number, show little variation from the type, except one male, in which the fifth joint of each antenna is deformed.

Collected in numbers by Professor C. V. Piper, in the Blue Mountains of Oregon, and the Bitter Root Mountains of Idaho, feeding on the flowers of the black-berried elder, *Sambucus melanocarpa*.

The following table will aid in the identification of the species of this genus:

I. Elytra with basal third orange-colored, posterior two-thirds blue, without orange margins. Sexes equal in size and of the same color. Elytra of ♂ not distinctly narrowed towards apex. *palliatu*s.

II. Elytra with orange margins in one or both sexes; males smaller, with elytra distinctly narrowed towards apex.

A. Elytra with narrow orange margins in both sexes.

a. Elytra pubescent *cribripennis*.

b. Elytra glabrous, punctures dense and fine towards apex *californicus*.

B. Elytra with orange margins in female; entire elytra orange in male.

a. Female elytra with narrow orange margins . . . *piperi*.

b. Female elytra with broad orange margins, darker only on median dorsal surface *auripennis*.

—Mr. Pratt exhibited slides and figures of larvæ, pupæ and adults of *Ceratopogon guttipennis* Coq. which he had found in the mountains at Bluemont and Woodstock, Virginia. The larvæ were found living in hollow tree stumps filled with water, in company with larvæ of three species of mosquitoes; *Culex triseriatus*, *C. signifer*, and *Anopheles barberi*. Their food seemed to be the rotting leaves, dead insects and other débris. He stated that the little "gnats," or, as they are locally called "punkies" or "no-see-ums," were exceedingly troublesome, especially early in the morning. Mr. Burke asked if any species of *Ceratopogon* occurred on the Pacific coast and M

Pratt replied that he had seen specimens from California and there was no reason why other species should not exist on the coast further north. Dr. Hopkins stated that he had had some experience in West Virginia and Maine with these insects and they were exceedingly troublesome.

—Dr. Hopkins exhibited specimens of fossil mesquite wood from Texas Hill, Arizona, showing distinct fossilized borings, apparently of a Cerambycid larva; and some fragments of petrified wood from the same locality showing insect borings filled with perfectly preserved egg-like objects.

—Dr. Hopkins made a few remarks on the Scolytid larvæ and their mouth-parts. He stated that he had found very constant characters in the larva which greatly simplified the classification of several groups. A box of pinned larvæ was exhibited, and several plates of drawings were also shown. Dr. Gill asked if the larval hooks mentioned by Dr. Hopkins were co-ordinate with any character in the adult. Dr. Hopkins replied that so far as he could determine they were not.

—Mr. Banks presented the following paper:

NEW TRICHOPTERA FROM JAPAN.

BY NATHAN BANKS.

Some time ago Mr. S. I. Kuwana sent me a small collection of caddice-flies from Japan. I was at work on them when Mr. Nawa reached Washington bringing some more species. The following paper is based on these two collections. They contain 25 species, 9 of which have been described, 12 of which I describe herewith, and four are represented by females not sufficiently characteristic to be described. Two of the described species have only just been published by Dr. Ulmer, and I had them in manuscript. Three new genera are described, all in the Limnephilidæ. None of the species are European, but one was described from Eastern Siberia. Doubtless collections from the northern parts of Japan will show some European species.

Too few species are as yet known to make any generalizations regarding the trichopterous fauna of Japan. There are several remarkable genera present, most noteworthy is *Perisoneura* which has a series of costal cross veins. It may be also mentioned that the largest caddice-fly known is from Japan, *Holostomis regina*, a magnificent insect.

Phryganea latipennis n. sp.

Face pale brown, vertex with long yellowish hair in middle, brown on sides; antennæ pale, basal joint brown; palpi brown; thorax pale, with yellowish hair in a broad stripe through the middle, and brown on the sides; abdomen brown; legs pale yellowish, anterior and middle tibiæ brown, especially on outside; wings gray, with much black hair along basal part of costa; pterostigma black, containing a few white dots, and behind it in the base of the first apical cell is an elongate dark spot, also a smaller one near base of the third apical cell; the middle area of wing before the discal cell is very pale; the outer margin blackish, extending up on the veins; anal region pale; venation mostly pale; hind wings gray-hyaline, dark on costal area, blackish at the pterostigma, and clouded at tip. Both wings very hairy. Discal cell of fore-wings much shorter than pedicel, shorter than in *Ph. sordida*.

Expanse 30 mm.

One specimen from Gifu, Japan.

Nemotaulius n. gen.

In most respects similar to *Grammotaulius*, but in the hind wings the first apical sector is connected to the radius or runs into it near tip.

Type: *Gr. brevillea* McLachlan.

In the specimen before me, which I consider the same as McLachlan's, the apical sector runs into the radius just before tip.

Nothopsyche n. gen.

Near to *Chilostigma*; differs therefrom in the longer palpi, the second joint of the maxillary palpi being longer than the third, in the slender labial palpi, and in the less strongly marked pterostigma. Spurs 1-2-2; discal cell very long, fifth apical cell acute at base in both pairs, and barely reaching the anastomosis, fourth in hind wings broad at base.

Type: *N. pallipes* Bks.

Chilostigma ruficollis Ulmer, recently described in the *Stettiner Zeitung* from Japan, also belongs to this genus. I have a specimen of it from Gifu.

Nothopsyche pallipes n. sp.

Face pale yellow, vertex blackish, with a median reddish line, and paler behind, with black bristles; palpi pale; antennæ pale, basal joint blackish, especially above; prothorax pale, with some black bristles above; rest of thorax rather reddish; abdomen pale on base, brown toward tip above, venter pale; legs pale yellowish, the tarsal joints darker at extreme tips, spines black, none above on tibia i. Fore-wings yellowish hyaline, minutely tuberculated, with appressed yellowish and scattered erect black hairs; the extreme outer margin faintly dusky, a hyaline mark at arculus; hind wings gray hyaline, barely darker towards tip. The

maxillary palpi are very long, the second joint plainly longer and thicker than the third; labial palpi short, slender (not as long as in *N. ruficollis*). Wings rather broad, broader than in *N. ruficollis*, venation similar to that species, but the discal cell is a little longer, and the radial sector a trifle more bent at the pterostigma.

Expanse 34 mm.

One specimen from Gifu, Japan.

Moropsyche n. gen.

A Limnephilid; maxillary palpi of male slender, second and third joints subequal; vertex elevated transversely in the middle, the black ocelli at sides of this elevation; basal joint of antennæ not very long; prothorax short; spurs 1-3-4; fore-wings rather narrow, subcosta running into costa, discal cell short, vein closing it weak, forks 1, 2, 3, and 5 present, fork 1 not reaching the discal cell, the pedicel about one-half the length of fork, fork 3 almost reaching the anastomosis, median sector arising just a little before the anastomosis, so that the arcus is as far out as anastomosis; in hind wings the discal cell is open, fork 1 very short, with long pedicel, forks 2 and 3 acute at base, latter not reaching the cross-vein.

Type: *M. parvula* Bks.

Moropsyche parvula n. sp.

Black, some yellow hairs on face, and near base of antennæ; legs pale, especially the tibiae and tarsi, these with black spurs and black spines. Wings blackish, or fumose, sparsely black haired, and with much appressed yellow hair; antennæ distinctly crenulate within. Wings narrow, rather rounded at tips, venation rather fine.

Expanse 12 mm.

Two males from Hikosan, Buzen, Japan, 28 March.

Brachycentrus vernalis n. sp.

Head black, clothed with black hair; maxillary palpi with very long black hair, labial palpi with short hair; antennæ rather heavy, dark brown, first joint black, not elongate; thorax black, with black tufts on anterior lobes; abdomen black, with a few black hairs; legs black on coxae and femora, paler beyond, especially on hind pair, which are clothed with short, whitish hairs; wings dull black, darker along costa and hind margin. Venation as usual in genus.

Expanse 22 mm.

Two specimens from Hikosan, Buzen, Japan, 28 March.

Gara japonica n. sp.

Similar in size and general structure to *G. pilosa*, but paler yellow throughout; the swollen area in the front wings at end of the "area interclavialis" is not near as large as in *G. pilosa*; the fork of front wings

extends fully to middle of discal cell (on outer third in *G. pilosa*); fork 3 has a shorter pedicel than in that species. The comb on venter of male has five teeth each side, and the middle one is not much longer than the others; the male genitalia also differ.

Expanse 18 mm.

Two males from Kawana, Japan, 25 June.

Crunæcia albicornis n. sp.

Head black, with tufts of long black hair above eyes; antennæ black, on basal joint with long erect black hair all around, beyond this joint the antennæ are nearly white, the first few joints marked with black; palpi pale brown; thorax black, with some tufts of black hair in front; abdomen dark brown; legs pale brown, almost white on tarsi; wings blackish, with long black hairs, and short, yellowish appressed hairs, fringe blackish, with two or three white patches on outer part, hind wings blackish, with some short yellowish hair, fringe long, some white spaces in it between ends of veins. Structure, in general, similar to the other species; spurs 2-4-4; basal joint of antennæ very long and slender and densely clothed with long hair, no cilia on thread of antennæ; maxillary palpi small and slender, pendant. Wings with forks 1, 2, 3, 5; discal cell longer than the pedicel, but fork 1 extends only a little way on it, fork 3 reaches anastomosis, but not farther, the cross-vein connecting cubital and anal is before middle of discal cell; in both wings the cross-vein at base of the fourth apical cell is hyaline white.

Expanse 20 mm.

Two specimens from Hikosan, Buzen, Japan, 28 April.

Perissoncúra similis n. sp.

Jet black; front and middle legs nearly white, hind pair darker; male with a large white spot in each wing beyond the anastomosis, elongate and bent outwards, the inner side distinct, but outer edge ragged and fading out, the one in fore wing has the inner side angulate, the one in hind wings has the upper part of inner side concave; female with wings entirely black, except faint small whitish spot in base of second and fourth apical cells, and on the thyridium, in the hind wing a small spot in base of fourth apical cell. Wings shaped about as figured for *P. paradoxa* McLach. or a trifle more elongate; the costal cross-veinlets are present, but the discal cell is longer, the apical cells rather shorter, the anastomosis more regular, and fork 4 is absent in both sexes.

Expanse. ♂, 46 mm., ♀, 50 mm.

Two males and one female, from Hikosan, Buzen, 29 May, and Tsuno, Buzen, Japan, 8 May.

Perissoncúra japonica n. sp.

Similar in most respects to *P. similis*, it differs in shorter and more rounded wings, the white spots of male are broader, not so elongate,

placed a little nearer the tip, and with the outer margin as sharp and distinct as the inner edge, the inner side of the mark in both wings is slightly concave; the general color of the wing is more of a deep brown than a black, and is rather shining. The species is also smaller than *P. similis*. The genitalia show differences as figured.

Expanse. ♂, 38 mm., ♀, 44 mm.

One pair from Gifu, Japan.

This is probably the species figured by Dr. Ulmer as the male of *P. paradoxa*, which was described from a female. However, McLachlan says that fork 4 is present in forewings and so figures it, while in this and *P. similis* fork 4 is absent in both sexes. Dr. Ulmer says nothing about this matter. Moreover the anastomosis of *P. paradoxa*, as figured, is very much more irregular than in either of my species. Therefore, I believe that *P. paradoxa* is unknown to Dr. Ulmer and myself, and that there are at least three species of *Perissoneura* in Japan, if indeed my two species do not form another genus on account of the absence of fork 4.

Odontocerum japonicum n. sp.

Black; wings brown, anterior pair rather darker than hind pair, and darkest in the apical third; legs brown, tibiae and tarsi paler. Differs at once from the European *O. albicorne* in that the discal cell of fore wings is extremely long, fully five times as long as its pedicel, the first apical cell not reaching back on the discal cell more than one-fifth its length; the fifth apical cell has a pedicel rather longer than in *O. albicorne*, and the third apical cell is also acute at base, and short pedicellate. The antennae are barely dentate.

Expanse 34 mm.

Two specimens from Gifu, Japan.

Molanna marsta n. sp.

Brown; wings dusky, with some black, and more yellowish appressed hair, blackish on apical margin, and extending somewhat up on the veins; hind wings paler, the costal area rather yellowish, fringe of anal region very long, gray, especially long on the basal lobe; legs yellowish, with yellowish spurs, and some fine black spines on underside of the tibiae and tarsi. In fore wings the median vein beyond the anastomosis has three branches; the first apical cell is swollen above near tip. Venation of hind wing of male as figured.

Expanse 27 mm.

One male from Gifu, Japan

A black winged female *Molanna*, also from Gifu, probably represents another species, as it is smaller.

Arclopsyche japonica n. sp.

Head black, a tuft of black hair between bases of antennæ, elsewhere mostly with yellowish hair, basal joint of antennæ brownish, beyond yellowish, and beyond basal third more brownish again; prothorax densely clothed with yellow hair, rest of thorax with but few hairs, except anterior lateral tufts; abdomen black; legs yellow, spurs and tarsi more brownish. Wings clear yellowish, outer and posterior margin black; a black streak from pterostigma extends along radius and subcosta toward, but not reaching, base, and an oblique band across wing from pterostigma, forked behind; just before posterior apical angle there is a large yellow spot; hind wings yellow, with outer margin black from the pterostigma to tip and along apical margin, and the posterior margin narrowly black, an oblique black band, not very heavy, from pterostigma across wing to near the middle. Venation very similar to *A. ladogensis*; an oblique costal cross-vein, a cross-vein from the short discal cell to the radius, all five apical forks present, no ocelli, spurs 2-4-4, no filament on sides of male abdomen, antennæ sub serrate within, joints 2, 3, 4, of maxillary palpi subequal in length, 5 long and slender.

Expanse 22 mm.

Hikosan, Buzen, Japan, 28 April; also from Gifu.

Philopotamus japonicus n. sp.

Head black, with a few hairs; palpi brown; antennæ dull black; prothorax with some golden hair, rest of thorax and the abdomen dark brown or blackish; legs pale brown; wings brown, clothed with short, appressed black hair, and with about thirty or forty spots of golden yellow hair. Venation dark brown, hind wings fumose, forks 3 and 4 pedicellate, fork 3 with longer pedicel; otherwise venation as usual. The male appendages are two-jointed, but lack the extra appendage from the basal joint that is figured for the European species.

Expanse 16 mm.

Three specimens from Hikosan, Buzen, Japan, 28 March.

The other species in the collection from Japan are as follows:

Holostomis regina McLachlan—Gifu.

Phryganea japonica McLachlan—Gifu.

Phryganea sordida McLachlan—Gifu.

Glyptotælius admorsus McLachlan—Gifu.

Nemotælius brevilinea McLachlan—Gifu.

Limnephilus sp. ♀—Gifu.

Nothopsyche ruficollis Ulmer—Gifu.

Rhabdoceras japonica Ulmer—Gifu.

Rhyacophila sp. ♀—Gifu.

Glossosoma sp. ♀—Gifu.

Macronema radiatum McLachlan—Gifu.

Hydropsyche sp. ♀—Gifu.

Stenopsyche griseipennis McLachlan—Akamura, Kawana, and Gifu.

Besides these there are described from Japan the following: *Phryganea melaleuca* McLachlan, *Perissoneura paradoxa*, McLachlan, and two species of *Rhyacophila*, by Morton.

EXPLANATION OF PLATE III.

- Fig. 1.—*Nothopsyche pallipes*, genitalia, ♂.
 2.—*Arctopsyche japonica*, fore wing.
 3.—*Moropsyche parvula*, genitalia, ♂.
 4.—*Perissoneura similis*, ♀.
 5.—*Molanna mæsta*, hind wing of male.
 6.—*Molanna mæsta*, male genitalia.
 7.—*Philopotamus japonicus*, genitalia, ♂.
 8.—*Moropsyche parvula*, hind wing.
 9.—*Gæra japonica*, genitalia, male.
 10.—*Nothopsyche pallipes*, maxillary palpi, male.
 11.—*Crunæcia albicornis*, head of male.
 12.—*Perissoneura japonica*, genitalia.
 13.—*Brachycentrus vernalis*, genitalia, top view.
 14.—*Brachycentrus vernalis*, genitalia, side.

Mr. Ashmead asked to what fauna the Japanese species were allied. Mr. Banks replied that there was too little known to venture any opinion. He stated that one species spreads over the Malayan region and another, a *Macroneuron* from E. Siberia, is not represented in Europe, but does occur in the tropical regions. Dr. Gill asked if the adult had ever been bred from the valvate case described by Isaac Lea as a shell. Mr. Banks stated that as far as he knew it had not been.

—Dr. Howard called attention to a recent report received by him relative to "blind mosquitoes" in Florida. He asked Messrs. Ashmead and Quaintance if they could throw any light on the subject. Mr. Ashmead stated that the insects were males having plumose antennæ and so far as he knew had not been identified. He had observed their assembling in houses.

Dr. Howard stated that the site of the house where the present meeting was being held was one of his collecting places years ago.

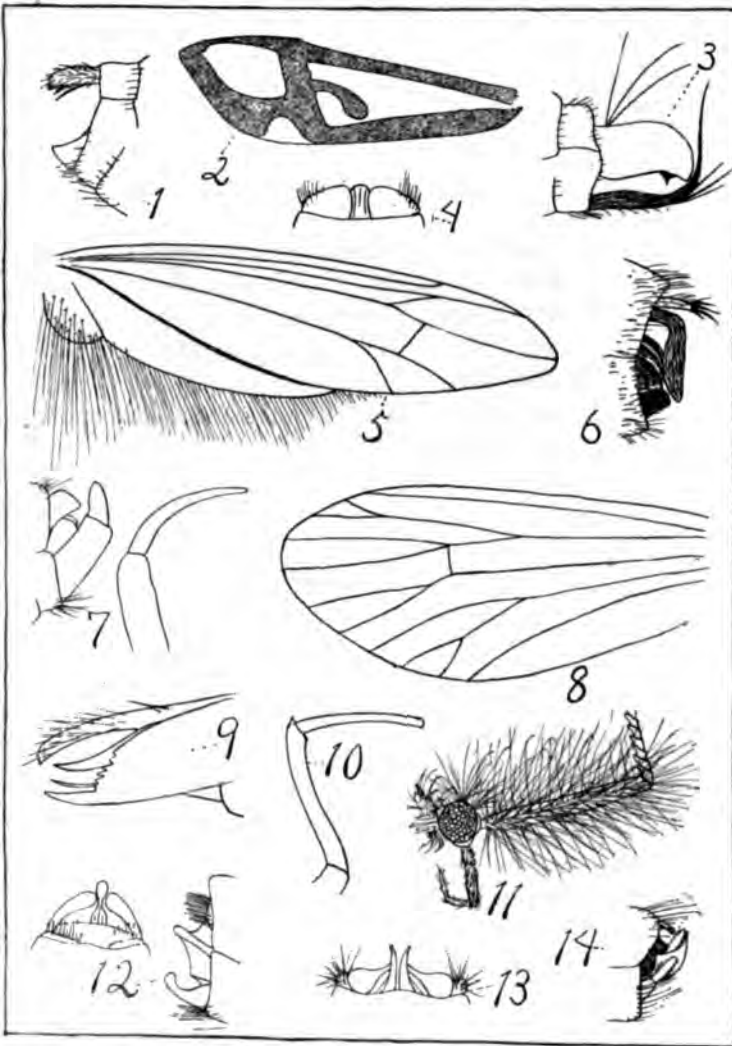


PLATE III.
NEW TRICHOPTERA FROM JAPAN.

APRIL 6, 1905.

The 195th regular meeting was held in Sangerbund Hall with the Vice-President Dr. Hopkins in the chair. Members present: Messrs Barber, Benton, Chittenden, Couden, Currie, Gill, Heidemann, Knab, Morris, Patten, Piper, Pratt, Quaintance, Sasscer, Schwarz, Titus, Ulke, Webb, Webster. Visitors: Messrs. Clemons, Pincus, Strauss, and Ulke.

Motion made and carried that a committee of two of the younger members be appointed by the chair to make an inventory of the number of copies of each number of our proceedings now on hand and available for sale. Committee appointed, Messrs. Barber and Titus.

Mr. Chas. S. Davis, No. 9, The Lexington, Washington, D. C., was elected an active member

Mr. F. M. Webster exhibited specimens of *Isosoma* spp. and presented the following paper:

A NEW ENEMY OF TIMOTHY.

BY F. M. WEBSTER.

In 1898 there was sent to the Department of Agriculture from Jamestown, Pa., a number of stems of timothy containing larvæ. Nothing but *Eurytoma*, however, emerged from them, and as this is a genus of parasites, nothing could be determined relative to the true depredator.

In July, 1904, a considerable number of timothy stems were sent to the Department from Marcellus, N. Y., some of which contained larvæ unmistakably of *Isosoma*.

In August and September following the receipt of this New York material, I found apparently the same insect infesting timothy at Dublin, and Falls Church, Va., in Maryland, about Washington, in Ohio, Michigan, Indiana, Illinois and North Dakota. Later, one of my assistants, Mr. Phillips, found seemingly the same thing in timothy at Knoxville, Tenn., Rives, Ky., and Cranesville, W. Va., while another assistant, Mr. Reeves, found similar larvæ in timothy in Iowa and Nebraska, so that by December last we had material from 22 localities, in 13 States. With two or three exceptions we have reared adults from all of these collections, besides, in several instances, rearing them also from hay taken from barns during the past autumn and winter.

As yet no special effort has been made to determine the species and there may be more than one involved. With what data we now have, this infestation appears rather more marked in the east than to the westward, although it was reared fully as abundantly from Sault Ste. Marie, Mich., as from New York, but this may be due to a seemingly utter lack of parasites in the former locality.

While it is yet too early to attempt to forecast its economic significance, it may be stated that I have been able to rear adults in greatest abundance from material secured where timothy hay is a main farm crop. Also, there has been no difficulty in rearing it from hay taken from meadows of several years standing and where last year's crop was short and the heads of the grass very small. So, too, where we get adults in greatest abundance a short crop of hay and seed was reported. I have so far been unable to locate those larvæ in timothy about my own farms in northern Illinois, where we allow a meadow to stand but one year and then pasture it, and road-sides are kept mown off during the summer. These larvæ work in the joint, precisely as does the summer form of *Isosoma grande* and they do not distort the stem after the manner of *I. tritici* in wheat.

While all of this would indicate a foreshortening of the stem, and therefore a serious injury to the timothy hay crop, as well as a shrinking of the seed, also a valuable crop, we still lack the careful and exact studies in the field, necessary to prove this, and these we hope to supply during the coming summer¹. It should be stated, however, that larvæ have frequently been found in timothy stems of rank growth and seemingly full development. Whether we shall finally encounter the same species in other grasses, or not, I cannot now say, but at least closely allied forms are obtainable from other grasses, both wild and cultivated.

Now, as to parasites. While, in our rearings from timothy, we get a limited number of the old and well known parasites of other species of *Isosoma*, viz, *Eupelmus allynii*, *Stictonotus isosomatis* and *Semiotellus chalcidephagus*, these have occurred comparatively rarely, though it must be stated that none of them have been found in great numbers, even in cases where *Isosoma* were excessively abundant in grain fields, as is usually the case. An undescribed species belonging to the genus *Cryptopristus* reared in immense numbers from wheat seriously affected by *Isosoma tritici* from Dublin, Va., to Clare, Mich.,

¹ Since the presentation of this paper it has been shown that shrinkages in the seed may amount to from 5 to 18 per cent.—F. M. W.

has not once been encountered in connection with our rearings of *Isosoma* from timothy, even where the wheat and timothy were growing in the same locality. The principal parasite and one that is clearly holding the timothy *Isosoma* in check in some localities, is *Syntomaspis lazuella*, and where this occurs in greatest abundance we almost invariably get few or no *Isosoma* from timothy, while if few parasites occur the reverse is the rule. This *Syntomaspis* also deserves more than a passing notice. Its occurrence is peculiar. It may be reared in abundance from *Isosoma* infested rye, but not from similarly infested wheat, even where the two grains are grown on the same farm. I have never got a single individual from either wheat or *Elymus*, though both were badly infested by *Isosoma*, while it was certainly excessively abundant in the neighborhood and reared there from both timothy and rye, known to contain *Isosoma* larvæ.

There seems to be an interesting feature of this *Syntomaspis* involving both color and geographical distribution. Specimens reared from timothy and other grasses, except *Elymus*, from Virginia, Ohio, Michigan, Indiana, Northern Illinois, North Dakota and (the type) West Cliff, Colorado, are metallic green, with metallic, more or less blue, abdomens, while those from Kentucky, Tennessee, Georgia, Alabama, Mississippi, Texas, Oklahoma, and Kansas, are entirely of an indigo blue. Curiously enough, in southeastern Nebraska and southern Iowa we find both colors intermixed. These color differences are more marked in fresh specimens. It is possible, of course, but hardly probable, that these two colors indicate different species.

Mr. Ashmead stated that he also had noticed color differences in several species of *Pteromalidæ* and *Torymidæ* from blue to metallic green. The same difference also occurs in some *Chrysididæ* and in some *Carabid* beetles. Mr. Ashmead also stated that he had lately received from Ivan Vassilief, from Russia, a species of *Isosoma* which that gentleman reported was parasitic on *Cephus pygmaeus* in wheat stems. This Dr. Ashmead stated was of course only an error of observation.

Dr. Gill called attention to the cases in nature where allied species are constant for one species and variable in the other. He stated that there were several notable examples among the shells. Mr. Schwarz made some remarks on the extreme

variation which occurs in some species of Coccinellidæ and stated that in this family many species have the power of varying from the spotted to the unspotted form and to the melanic form, citing as an example species of *Hippodamia* and other allied genera. Many of the forms are considered good species by some of our writers on this family. Mr. Knab remarked upon the effect of temperature on the coloration of different forms and said that in Europe experiments have been made to show that the melanic form can be produced at will by subjecting pupæ to both extremes of temperature. He mentioned the fact that the melanic form of *Adalia bipunctata* always occurs in the fall. Prof. Piper spoke of the extensive breeding experiments carried on at Leland Stanford University by Prof. Kellogg. Mr. Ulke spoke on the variability of *Hyperaspis* and *Exochomus*. Mr. Schwarz stated that he believed all species of these genera are spotted and that the uniformly black ones are all variations. Mr. Webster noted the fact that some metallic green insects remain their natural color if dropped in potassium cyanide while the same species placed in alcohol would turn blue.

—Mr. Titus exhibited larvæ and adults of a sawfly (*Taxonus nigrosoma*). One of these larvæ was found by Mr. Couden in an apple purchased in Washington. It had made a short channel in one end and had evidently chosen this as a convenient place in which to hibernate. This species has been reared by Dr. Dyar from *Rumex* and *Polygonum* and by Mr. Titus from sugar beet. The habit of pupating in apples has also been reported by Dr. Fletcher in Canada.

—Mr. Barber exhibited specimens of a curious larva, with slides and photographs, and presented the following note:

ILLUSTRATIONS OF AN UNDETERMINED COLEOPTEROUS LARVA.

BY H. S. BARBER.

On May 12, 1903, during a few hours collecting at Hesperia, Cal., under the dry bark of a dead tree-yucca (*Yucca arborescens*) the writer found a colony of queer larvæ which puzzled him greatly. They were placed in a small tin box with some

of the bark and débris which was near them and mailed to Washington. But unfortunately no observations were made regarding their natural food. The specimens were placed in a breeding-jar with part of the root of a small yucca cultivated in the grounds of the Department of Agriculture, and attempts were made to feed them, but without success. One by one they died till but one, the largest, was left. This one finally died in July, 1905, having been alive, in captivity, and without feeding, for twenty-six months, during which time probably two skins were cast, though no record was kept. The heads of the cast skins could not be found.

The larvæ are extremely slow in their movements, lying with the fringe surrounding their bodies closely appressed to the uneven surface of whatever they may be placed on, the tail extended, but if disturbed the head is slightly raised, and the tail bent forward over the back. This is the position in which most of them died.

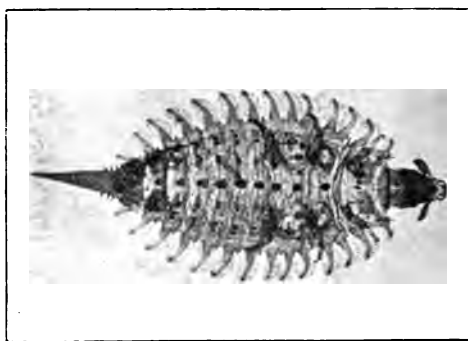


FIG. 11.—Undetermined coleopterous larva (enlarged about $5\frac{1}{2}$ diameters).

Slides were made from some of the dead specimens and the accompanying photomicrographs were taken from them.

No one has, as yet, satisfactorily placed the insect, but to all appearances it is coleopterous, as there are serious objections to its being placed in any other Order. The first opinion of several authorities has referred it to the Endomychidæ, but this has always been withdrawn on further examination and generally no opinion given in its place. In want of a more satisfactory location Mr. Schwarz suggests that it may possibly represent an unknown genus in the subfamily Phengodinae of the Lampyridæ.

The body is very flat, oval in outline, bearing a lateral fringe similar to that of an *Ascalaphus* (as figured by Westwood, *Trans. Ent. Soc. Lond.*, 1888, pl. 1), but more uniform; a dorsal row of tubercles, and a tapering tail, one-fifth as long as the body. The color is a dirty brown above, paler beneath. Length 7 to 10 mm.; width $3\frac{1}{2}$ to $4\frac{3}{4}$ mm.



FIG. 12.—Undetermined coleopterous larva: A, lateral spine of tail with small scale-bearing tubercle such as cover tail and head, at base; B, D, side views of mushroom-like scales and tubercles, from body; C, top view of D.



FIG. 13.—Middle leg and fringe of meso- and metathorax and first abdominal segment of undetermined coleopterous larva (enlarged about 27 diameters).

The vestiture is so remarkable as to deserve special mention. It consists of hairs modified in a manner unknown to me in any other insect. A very few of the simplest ones are found in unexposed places and appear as simple flat scales, generally truncate, but a few are sharp pointed, set in a shallow pit,

around which the chitin is somewhat thickened. They are better developed wherever the surface of the larvæ is exposed, reaching their extreme development in the lateral fringe, and on the three lateral spines of the tail. For the commoner type—that which covers the greater part of the upper surface of the body—the thickened ring supporting the modified hair is produced into a tubercle in the hollow apex of which is set the hair which broadens out after a short stalk into a flaring funnel- or umbrella-shaped organ, not unlike some fungi.



FIG. 14.—Head and prothorax of undetermined coleopterous larva enlarged about 16 diameters.

Those on the sides of the head point slightly forward and only the forward part of the flaring lip is produced, and the reverse is true of the tail. The three lateral spines of the tail (Fig. 12, A) and the teeth of the lateral fringe (Fig. 13) represent the most exaggerated form of this vestiture—the tubercles being lengthened to about four times their width, and supporting an irregularly fluted, triangular scale.

The head (Fig. 14) tapers anteriorly and is slightly constricted about the middle, with a single ocellus in the constriction on the side just behind the antennæ, which are apparently two-jointed; basal joint very small; second joint extremely large, flattened, concave, smooth, and without vestiture on the under side; its upper surface slightly convex and sparsely studded with coarse, scale-bearing tubercles similar to those on the body.

There is, however, a third joint situated at the apex of joint ii, which is so reduced in size as to be easily overlooked, being only about one-third the length of the scales with which the second joint is clothed.

Labrum small, trapezoidal, widest in front and supporting four regularly placed spines on the front edge. Mandibles simple, sickle-shaped, sharp-pointed, grooved on upper surface. Maxillary palpi four-jointed, second joint very large, terminal joint very small, cylindrical.¹ Maxillæ very small, almost hair-like, about one-fourth as long as palpi, very inconspicuous. Labium small, trapezoidal, bearing two-jointed palpi which project almost as far as the maxillary palpi.

There is nothing extraordinary about the legs, which each bear a single large simple claw, the latter apparently not being articulated with the tibia.

In addition to the median row of dorsal tubercles there are three main lateral rows of chitinized spots on the abdominal segments, which become confused and irregular on the thoracic segments. I am unable to see spiracles on the thoracic segments or the last two segments of the abdomen, but there is a very distinct spiracle near the outer edge of each of the first seven dorsal abdominal segments just in front of the outer chitinized spot.

The last abdominal segment is produced into a conical tail which bears on each side at base three lateral spines each surmounted by a triangular scale (Fig. 12, A). The upper surface of the tail shows a row of about nine tubercles.

Perhaps the most conspicuous characteristic is the lateral fringe which is about one-sixth of the entire width and is composed of fourteen lobes on each side, two on each thoracic segment and one on each abdominal segment except the last. Each lobe consists of a curved central stalk from either side of which arise four to twelve curved processes, the tip of each being truncate and bearing a fluted, triangular scale. These processes are homologous with the tubercles and modified hairs, described above, which cover the whole body.

It is hoped that future observations will solve the mystery connected with this interesting larva.

Mr. Knab presented the following communication:

¹In one of the specimens there is a queer deformity, the second joint giving rise to an extra third and fourth joint on the upper surface.

A NEW SPECIES OF DONACIA.

BY FREDERICK KNAB.

A study of the *Donacia* material in the collection of the Illinois State Laboratory of Natural History brought to light an interesting series of a species which could not be located by Mr. C. W. Leng's Revision of our species.¹ An attempt was made to locate this species with some of the many forms that have been described and relegated to the synonymy, but without satisfactory result. Finally a specimen was sent to Mr. Samuel Henshaw, Curator of the Museum of Comparative Zoology at Cambridge, Mass., with a request to compare it with the material in the LeConte collection. In his reply Mr. Henshaw wrote: "I consider it distinct from any in the LeConte collection which contains all the species recognized by LeConte and Leng."

The species belongs with *subtilis* in Mr. Leng's *Group C*, but is very distinct from any of the species defined in Mr. Leng's paper. Owing to its short thorax and rather broad and depressed form this species more nearly resembles the species of the *cincticornis* group, but the narrow mesosternum and the shorter legs and less swollen hind femora show its relationship to *subtilis*. The specimens were taken upon bulrushes, so that in habits, too, it differs from the species of the *cincticornis* group which frequent pond lilies.

Donacia curticolis n. sp.

Female: length 9.5 mm. Form rather broad, subdepressed. Color: body beneath metallic green, the prothorax ferruginous-yellow; head green; thorax above golden green upon disc, anterior and basal margins ferruginous-yellow; elytra ferruginous-yellow with golden lustre; antennæ dark, the basal segments with green lustre; femora ferruginous at base, the outer half metallic green; tibiæ and tarsi ferruginous, tinged with green.

Head obsoletely tuberculate between the eyes, with a deep median groove; surface confusedly punctured, clothed with pale yellowish pubescence. Eyes prominent. Frontal lobes prominent. Antennæ rather short, slightly over half the length of body; second segment very short, third slightly longer. Thorax straight-sided and without tubercles, broadening gradually to the front margin, half again as broad as long; surface shining, very finely wrinkled and confusedly punctured; anterior and basal margins broadly elevated, the front margin turned obliquely

¹Trans. Am. Ent. Soc., v, 18, pp. 157-176.

backward near the broadly rounded angles; median groove distinct, fading out before reaching the base. Elytra with the humeri broadly rounded and depressed, broadly elevated around the scutellum, truncate at tip and minutely dentate at inner angle; two oblique depressions near the suture, one before the middle, the other behind it, a very faint third depression towards the tip; the outer half slopes obliquely from behind the humeri; the punctures in rows, very coarse and close together, less coarse and deep towards the apex; interspaces more or less convex, the surface shining, finely and closely transversely wrinkled. Legs slender, the posterior femora with a stout tooth; the posterior tibiae with the apical half curved inward. Mesosternum narrower than the coxa. Pygidium slightly rounded, almost truncate. Under surface clothed with pale yellowish pubescence.

Types in the Illinois State Laboratory of Natural History and U. S. National Museum and the collection of the author.

Localities: Fourth Lake, Lake Co., Ill., 2 and 5 Aug., 1887 (on bulrushes, Garman and Hart); Normal, Ill., Sept., 1880 (one specimen); Indiana (one specimen).

The species varies in coloration. Of the 19 specimens examined five are ferruginous-yellow above and below, with only the head green and the femora touched with the same color. One specimen is entirely golden green above, the under side of the prothorax and the margins of the ventral segments ferruginous and traces of the same color on the legs. The other 13 are the type form.

The following paper by Mr. A. N. Caudell was then read:

**THE SPECIES OF THE GENUS CHIMAROCEPHALA AND
DESCRIPTIONS OF TWO NEW SPECIES OF
CALIFORNIAN ORTHOPTERA.**

BY A. N. CAUDELL.

The genus *Chimarocephala* was established by Scudder in 1876 for four species, *viridifasciata*, *brevipennis*, *cubensis*, and *pacifica*. In 1884 Saussure removed the first three species to his new genus *Chortophaga*, leaving only *pacifica*, which is therefore the type of *Chimarocephala*. At the same time Saussure described a new species of *Chimarocephala*, *beherensi* from California, and referred to that genus his *Tomonotus otomitus*, a Mexican species described in 1861. Saussure separated his new Californian species from Thomas' *pacifica*, also from California, on the characters of the thorax, which

he said was smooth with the median carina entire in the new species and rough and with the carina incised in *pacifica*. But, as proven by Thomas' original description and by his type, which is in the National Museum, Saussure did not correctly interpret his species, the characters attributed to *behrensi* really belonging to *pacifica*. *Behrensi* Sauss. therefore falls as a synonym of *pacifica* Thom. and the insect supposed by Saussure to be the *pacifica* of Thomas is unnamed. For this form I would propose the name *incisa* and would designate it as a variety rather than a species, the differentiating characters being variable.

One male specimen of *C. pacifica* from Monterey County, Cal., taken in August, 1904, by Mr. Coleman, agrees very well with the form *incisa* except that the vertex is much less elongate than usual and the body is somewhat thicker, giving it something of the appearance of an *Encoptolophus*. It is worthy of varietal distinction and may be called *obtusa*.

The species of *Chimarocephala* thus stand as follows:

Chimarocephala pacifica Thom.

behrensi Sauss.

Var.—*incisa* Caud.

pacifica Sauss. (not Thom).

Var.—*obtusa* Caud.

Chimarocephala otomita Sauss.

DESCRIPTIONS OF NEW CALIFORNIAN ORTHOPTERA.

Melanoplus sonomaensis n. sp.

A very small brachypterous species allied to *puer* and belonging to the *puer* series. Color brownish with dark markings. Head scarcely prominent in the female, slightly so in the male, reddish brown with piceous postocular bands; vertex feebly tumid, scarcely elevated above the pronotum, interspace between the eyes about as broad, male, or somewhat broader, female, than the basal segment of the antennæ; fastigium and frontal costa as in *puer*; eyes moderately prominent, more so in the male, longer than the infraocular portion of the genæ in both sexes. Pronotum with the lateral and median carinæ distinct, anterior margin truncate, posterior margin obtuse-angulate, almost truncate, especially in the female, the lateral piceous band scarcely continued onto the meta-zona in either sex. Prosternal spine stout, blunt, slightly inclined backwards; interspace between the mesosternal lobes as broad, male, or broader, female, than long; metasternal lobes of both sexes separated by a space much longer than broad, but in no ways attingent. Tegmina abbreviated, shorter than the pronotum in both sexes, scarcely twice as long as broad, apically broadly rounded and not meeting above in either sex, though not widely separated. Fore and middle femora somewhat

tumid in the male, the hind femora brownish with faint scalariform markings on the outer face, the inner face somewhat infuscated and the geniculations darkened; hind tibiae, in dried specimens, brownish or yellowish brown, the spines black-tipped, eleven to thirteen in outer series. Abdomen reddish brown with a lateral black stripe along the upper portion of the sides, in the male extending quite to the tip, in the female scarcely beyond the basal half. Tip of the male abdomen neither swollen nor recurved, subgenital plate noticeably narrower than long, apically forming a blunt tubercle; supraanal plate elongate-triangular, the sides straight, median sulcus broad, deep, extending across the basal half of the plate; furcula small, short blunt teeth overlying the submedian ridges of the supraanal plate; last dorsal segment of the abdomen, just outside of the furcula, diagonally sulcate as in the *aridus* series. Cerci of the male very slightly compressed and moderately incurved substyli-form appendages tapering considerably and quite uniformly on the basal three-fourths, the tip more gradually tapering to a moderately sharp point.

Length, male, 13 mm., female, 15 mm.; elytra, male, 2 mm., female, 2.5 mm.; hind femora, male, 8 mm., female, 8.5 mm.

Type.—No. 8386, U. S. National Museum.

One male, one female, Glenellen, Sonoma County, California. (E. S. G. Titus), collected on rocky hillside.

Scudder's table of the *puer* series, page 128 of his Revision of the Melanopli, may be modified for the reception of this species as follows:

f¹ Tegmina attingent; subgenital plate of male short and broad, its apical breadth surpassing the length of its lateral margins, not elevated apically. *flabellatus*.

f² Tegmina distant; subgenital plate of male distinctly narrower than long, elevated apically.

g¹ Pronotum of both sexes truncate posteriorly, distinctly emarginate mesially; interspace between the mesosternal lobes slightly longer than broad, male, or quadrate, female; metasternal lobes subattingent in the male; elytra widely separated. *puer*.

g² Pronotum obtuse-angulate, at least in the male, not emarginate mesially; interspace between mesosternal lobes quadrate, male, or transverse, female; metasternal lobes distinctly separated in the male; elytra not widely separated. *sonomaensis*.

Trimerotropis titusi n. sp.

A small species belonging to the *vinculata* group and falling next to Bruner's *inconspicua* but is in no way allied to it.

General color light brown with the elytra banded conspicuously. Head prominent, in the male noticeably elevated above the pronotum and

slightly broader than the anterior portion of it; vertex with the lateral borders well elevated and with a distinct and moderately prominent median carina; frontal costa narrow, scarcely more than one-half as wide as the interocular space in either sex, percurrent, sulcate at the ocellus and, like the entire face, punctate; eyes prominent, not as long as the infraocular portion of the genæ, in the female less than two-thirds as long; antennæ uniformly dark reddish brown. Pronotum moderately slender, the posterior process rectangular or acute, there being considerable variation in this respect; median carina moderately elevated on the prozona, linear on the metazona; prozona about two-thirds as long as the metazona. Elytra with a nearly solid black band at the humeral angle, a more or less broken one across the middle, and across the center of the apical half a third band which is usually broken up and lost in the black fleckings that occupy the apical fourth of the elytra; the basal portion of the elytra, before the humeral band, is darker in ground color than the rest of the ground surface; wings moderately broad, not quite twice as long as the greatest breadth; disk pale yellowish, the fuscous band represented by a cloud on the anal field and usually a slight infuscated spot near the costal margin; sometimes the band is not represented at all and there is never a costal tænia. Posterior femora ashy on the outer face with a black band across the apical third and a large infuscated spot on the upper half just before the middle; inner face black with two broad white bands, the lower sulcus white with a subapical black band and sometimes slightly infuscated on the basal half; hind tibiæ yellowish, the spines black on the apical half.

Length, male, 18 mm., female, 25 mm.; antennæ, male, 9.5 mm.; hind femora, male, 10 mm., female, 13 mm.; elytra, male, 18 mm., female, 21 mm.; width of wing at greatest point, male, 9 mm., female, 11 mm.

Type.—No. 8385, United States National Museum.

Eight males, 3 females, Spreckels, Monterey Co., California, on sugar beets, September 20, 1904 (E. S. G. Titus).

Superficially this species bears a very close resemblance to *Trimerotropis albescens* McNeill, but is very distinct from it. *Albescens* has the antennæ barred with black and white while here it is unicolorous, the pronotum of *titusi* is more slender than that of *albescens* and the color is considerably darker. Finally the hind tibiæ of *albescens* are blue while in *titusi* they are yellowish.

MAY 4, 1905.

The 196th regular meeting was held in Sængerbund Hall, and the president and vice president being absent Dr. H. G. Dyar occupied the chair. The following persons were present:

Messrs. Benton, Caudell, Couden, Barber, Dyar, Heidemann, Hopkins, Patten, Pratt, Titus, Ulke, members, and Messrs. Clemons, Knab, Pinkus, and Ulke, Jr., visitors.

Mr. Titus was appointed to act as Recording and Corresponding Secretary during the absence of Messrs. Currie and Benton.

Mr. Barber exhibited specimens of *Sphæridium scarabæoides* and a map showing its present distribution in America and presented the following notes:

THE SPREAD OF SPHÆRIDIDIUM SCARABÆOIDES LINNÆUS.

(COLEOPTERA, HYDROPHILIDÆ.)

BY H. S. BARBER.

The Genus *Sphæridium* is included in LeConte and Horn's Classification (1883) but with the following footnote: "A specimen of the European *Sphæridium scarabæoides* has been found in Canada. The species is undoubtedly introduced, and accidental in occurrence The name is included in Henshaw's Check list, 1885.

In 1893 Mr. G. Chagnon, of Montreal, Can., published¹ the following note: "*Sphæridium scarabæoides*, which has been introduced from Europe, is now very common here. I had the pleasure to send several specimens to Dr. Geo. H. Horn."

The next mention of its capture that I can find is by Mr. C. O. Houghton, in 1898,² where he records its occurrence at Potsdam, N. Y., in 1896, and gives an account of the habits.

Entomological News, Volume XII, 1901, has four notes on this species: R. F. Pearsall (p. 158) mentions LeConte and Horn's note, and records the capture in the Catskill Mts., N. Y., in July, 1900. C. O. Houghton (p. 209) records it from Ithaca, N. Y., in May, 1901; Mr. Luccareni (p. 256) from Split Rock Pond, Morris Co., N. J. (probably 1901?) and G. W. Caffrey (p. 296) records it from Bethlehem, Pa., May 28, '01.

Mr. Schaeffer gives a note concerning its spread,³ recording it from West Farms, N. Y., and also mentions Wisconsin and Canada.

Mr. Pratt took the species abundantly at East Providence, R. I., in August, 1903.

Mr. Dickerson reports it⁴ from Chester, Morris Co., N. J.,

¹ Ent. News, IV, p. 76.

² Ent. News, IX, p. 172.

³ Journ. N. Y. Ent. Soc., 1901, p. 94.

⁴ Ent. News, XIV, p. 97, 1903.

September, 1902, and Anglesea, N. J., July, 1902; and Mr. Bischoff adds the record for Irvington, N. J. Later¹ Mr. Boerner captured it at Philadelphia Neck, Pa.

In 1904² C. O. Houghton refers to its capture in, and disposal through New York, New Jersey and Pennsylvania, and adds Newark, Del., May 6, 1904 (?) to the list of places occupied by the invading beetles.

Mr. Frederick Knab, in 1905,³ records its capture by Mr. A. B. Wolcott, on the lake shore at Chicago, Ill., where the beetles had been washed up October 9, 1904. Mr. Knab also mentions capturing it at Mt. Tom, Mass., in the summer of 1902, and Hampden Co., Mass., in 1903. He also states that Rev. C. Crozet took it plentifully about Hartford, Conn., in 1901.

April 17, 1905, Mr. Pinkus brought a few specimens to the National Museum from Cabin John Bridge, Md., and a few days later Messrs. Schwarz, Clemons, and myself found it abundantly at the same place. Later Mr. Clemons brought it from Rock Creek Park, D. C.

Mr. Schwarz stated that usually when species of this character were introduced into Canada they would rarely spread southward. Since the species breeds in manure it will to some extent interfere with the development of dipterous larvæ.

—Mr. Pratt exhibited specimens of larvæ of *Abraxes grossulariata* L. that had been recently introduced into this country on *Euonymus*. The plants were sent to a Philadelphia nurseryman from England and these larvæ were noticed feeding on them by a United States Custom House officer at Baltimore, who sent them to the Bureau of Entomology.

—Dr. Dyar presented the following note on the food plant of *Derelomus* (*Notolomus*) *basalis* Lec.:

"Larvæ occurred to me at Miami, Florida, on the saw palmetto (*Chamærops serrulata*) and were sent to Mr. Kearfott to rear under the impression that they were *Lepidoptera*. However, the above beetle was bred, and it is thought well to here make a record of its food plant. The larvæ occur in the flower stems of the plant boring under the bracts that subtend the joints of the stem."

¹ *L. c.*, p. 242.

² *Ent. News*, xv, p. 310.

³ *Ent. News*, xvi, p. 53.

Mr. Schwarz stated that this genus is composed of small weevils, pale yellow, with scarcely any sculpture. Three species have been reported from Florida; one occurs in Texas; two in Mexico (one of these in palmetto), two in Cuba, usually on palmetto flowers. In Cuba an undescribed species lives in the royal palm.

—Mr. Benton exhibited specimens of, and spoke a few minutes on the Caucasus bee. He stated that it resembles the Carniolian type, gray, but more leaden in its ground color. It is very gentle; the Department of Agriculture has had some for two years and so far they require no bee veil nor smoke to handle them. The specimens were obtained from Tiflis, but great difficulty is experienced in getting queens. Mr. Benton stated that he soon expected to go to Tiflis and would try to get queens started for this country by a faster route.

—Mr. Heidemann exhibited specimens of a pretty little Capsid, *Sysinas lineatus*. One specimen was captured by Mr. Banks at Sea Cliff, N. Y.; the species has been hitherto known only from a specimen described by Distant from Mexico.

—The Secretary read the following note:

NOTES ON EULECANIUM FOLSOMI KING.

By T. D. A. COCKERELL.

This species was discovered by J. W. Folsom on pawpaw at Urbana, Ill., and was briefly published by Mr. King in the Canadian Entomologist for 1903, page 193. I was not quite sure of its distinctness from *E. lintneri*, and from the material seen I doubted the advisability of setting the thing forth as a new species. However, Mr. King, probably correctly, believed it to be distinct, and since it has now been published it will be advisable to present a fuller description.

Scale about 4 mm. long, $3\frac{1}{2}$ broad and about $1\frac{1}{2}$ high; flattened, rather light brown, with narrow transverse blackish stripes, the whole obscured by a copious white frosting; side more or less reticulately wrinkled. A larger (egg-laying) specimen was about $5\frac{1}{2}$ mm. by $3\frac{1}{2}$ mm. Skin orange-brown, with large gland-pits; margin strongly chitinated; stigmal spines in threes, one long and two short. Antennæ like those of *E. tarsale*; also resembling those of *E. kingii*, but joint 3 longer.

Measurements in μ : Antennal joints: (1.) 24; (2.) 36; (3.) 102-105; (4.) 21; (5.) 21; (6.) 33-37. Anterior leg: femur-trochanter, 155; tibia, 112; tarsus, 76. Eggs white. The following species agree in having 6-jointed antennæ, with 6 very much shorter than 3, 2 longer than 4 or 5, and 4 and 5 equal or almost so: *nigrofasciatum*, *capreæ* (cf. Douglas), *roseæ* (on rose), *tarsale* (Mass., on *Cornus*) and *folsomi*. It will be observed that some of the characters of *folsomi* suggest affinity with *E. nigrofasciatum*.

There being no further notes or papers Dr. Dyar spoke a few minutes on his recent trip to Florida and to the Northern United States and Canada. He stated that the season in Florida was very dry and the trip quite unproductive so far as mosquitoes were concerned. In the North very good results were obtained and larvæ of several of the early spring forms were being bred.

Mr. Pratt stated that he was now breeding adults from *Ceratopogon* larvæ from Woodstock, Va.; these had passed the winter as larvæ.

Some discussion followed on the absence of mosquito larvæ at Key West in the dry season, and also the effect the wholesale killing of mosquitoes would have on various algæ, bacteria, and other growths in the water.

JUNE 1, 1905.

The 197th regular meeting of the Society was held at the residence of Mr. J. D. Patten, 2209 R street, N.W., the President, Mr. Banks, in the chair and the following: Messrs. Ashmead, Benton, Banks, Gill, Hopkins, Marlatt, Patten, Simonds, Schwartz, Titus, and Uhler, members, present.

Mr. Titus, as a member of the committee to inventory the Society publications, presented the following report: Vol. I, 238 full sets; vol. II, 230; vol. III, 285; vol. IV, 292; vol. V, 314; vol. VI, 327; vol. VII, 334 copies of No. 1. The following copies of extras are also on hand: Vol. I, no. 1, 29, no. 3, 28, no. 4, 74; vol. II, no. 1, 15, no. 3, 85, no. 4, 63; vol. III, no. 3, 20, no. 3, 27, no. 4, 21, no. 5, 14; vol. IV, no. 2,

21, no. 3, 24, no. 4, 44; vol. V, no. 2, 8, no. 3, 8, no. 4, 11, (index vol. V, 69); vol. VI, no. 1, 12, no. 2, 8, no. 3, 19. There are also reported to be on hand 2,841 authors' extras of various papers. Upon motion of Mr. Marlatt the Society voted not to break sets of the publications below the 200 volumes.

—Mr. Ashmead exhibited some ants from Mr. Titus' collection from British Guiana and spoke a few minutes on the classification of the superfamily Formicoidea. He stated that while many writers had published articles on this great and complex group few had found, or at least had used, the really important and necessary characters. Among the authors who have written works of value he mentioned Mayr, Forel, and Emery. Dr. Ashmead has formed his classification on what he believes to be natural groups; of these groups he mentioned as examples the Cryptoceridæ, which are all fungus growers, the Myrmicidæ or harvesters, and the Dorylidæ or driver-ants.

—Dr. Ashmead also reported the receipt of many more Hymenoptera from the Philippine Islands through Father Stanton and Father Brown. Almost all of these were collected in the Observatory garden at Manila and represent many new species and several new genera. The number of species secured in so small an area gives some promise of what an enthusiastic and thorough collector should find in the remainder of the Islands.

—Mr. Schwarz exhibited the work of a leaf-rolling weevil (*Attelabus bipustulatus*) taken at Plummer's Island, Md. He stated that he wished to call especial attention to the excellent manner in which the rolls and leaf were preserved. This work had been done by Messrs. Pratt and Titus by putting the fresh green leaf into fine sand and slowly drying it by heat. There were five rolls on one leaf, the arrangement of the rolls giving the appearance of a flower.

In answer to queries on the subject Mr. Titus more fully explained the process of drying in sand and stated that there was much still to be learned about the preservation of colors; some colors could be preserved by this method while some

shades of green will change much more rapidly than others. Much seemed to depend on the amount and intensity of the heat applied, the slower steadier heat accomplishing the work much better than swift heat. The finest quality of white sand should be used; this can be procured of dealers in bird supplies.

Who was first responsible for the method seemed to be in doubt, as Mr. Titus had used the method previous to his coming to Washington and had no idea where he first heard of it. Mr. Pratt had stated that he had used this plan for drying for several years.

Dr. Hopkins reported having secured a parasite from the egg of this beetle which Dr. Ashmead stated belonged to the genus *Poropia* in the *Trichogrammidæ*.

—Mr. Marlatt spoke of the occurrence this year of brood XIII of the seventeen-year cicada in Wisconsin and Northern Illinois. Dr. Uhler spoke a few moments on the specimens of this cicada in his collection that had been collected in the vicinity of Baltimore, and stated that in his collection were specimens of the brood of 1785. He called especial attention to the variability of the species.

—Mr. Marlatt made a few remarks on the introduction of insects by the importers of plants. He called attention to the present rapid distribution and introduction of new and rare plants from all over the world by the Bureau of Plant Industry, and stated that this was becoming more and more noticeably a means of distribution of injurious insects. Our common injurious insects are doubtless often sent abroad, and although at present all importations by this Bureau are inspected at Washington, still some insects have already been admitted. *Pulvinaria psidii* had been found some half-dozen times and *Aspidiotus rossi* from India several times on tropical and subtropical plants from the country just named. Mr. Titus stated that three times during the present year the puparia of the Hessian fly has been found in wheat straw used in packing shipments of plants to this country from Tunis, Malta, and Algeria. With these lots of straw had also come several other wheat insects. Mr. Schwarz stated that the first commission

for investigating the subject of introduction of insects was Messrs. LeConte, Horn, and Riley at Philadelphia in 1876. Many things of interest were found in packing-straw used by the various exhibitors. Dr. Ashmead reported that a peculiar sawfly belonging apparently to the genus *Cimbex* was recently bred from an orchid received at London from Ceylon.

—Mr. Marlatt spoke a few minutes on his recent trip to Cuba, Florida, and Porto Rico. He said that the value to one studying the insects injuring any group of plants, by a trip through the region where those plants are cultivated, can scarcely be estimated.

The following papers by members of the Society have been accepted by the Publication Committee during the summer:

DESCRIPTIONS OF SOME NEW MITES.

BY NATHAN BANKS.

In my "Treatise on the Acarina or Mites,"¹ several mites, mostly of genera previously unknown in this country, were referred to, and figures were given of them. I had not then the time for their descriptions, and these are now furnished, together with those of a few other interesting forms that have recently come to my attention. References are given to those figured in the "Treatise." One new genus and twenty new species are added to the fauna of the United States.

Neophyllobius americanus n. sp.

Pale yellowish, body about once and one-third longer than wide. Legs large and long, and arranged in a radiate manner, the creature looking like a minute Phalangid, since leg iv is about as near to tip of body as leg i is to front of body. Above with a submedian row of six stout, simple bristles, and from anterior margin to humeral region an irregular submarginal row of six bristles; two more bristles each side at tip. Legs very long and slender as is usual in the genus. When seen under high power they are minutely, transversely annulate. The tarsal joint is distinctly swollen before the middle. All legs with a few long stout bristles, one from the patellar joint is especially long and prominent; no clavate bristles on tarsi or elsewhere. Last joint of palpus reclinate, much smaller than other joints and slender, with two long bristles near base and about

¹ Proc. U. S. Nat. Mus., xxviii, No. 1382, pp. 1-114, 1904.

three shorter ones on tip. Venter with a few long bristles on sides and shorter ones on the disc, the genital opening, a transverse slit, not far behind mouth parts. Anus at apex of body.

Body length .12 mm.

Three specimens on oak leaves at Orchard, Mobile Co., Alabama. Figured on page 25 of "Treatise on Acarina."

Gekobia texana n. sp.

Body over once and a half as long as broad, constricted rather beyond middle, rounded in front, beak very small, and not projecting far in front of body. Palpus rather slender, last joint acute, next to last showing a hairy elevation on the side, a long clavate hair each side at base of beak above. Dorsum with many capitate hairs, all of one height; four longer, simple hairs on posterior margin near tip; hairs on venter and legs are simple. Legs slender in two widely separate groups; all subequal in size, the hind pair scarcely reaching behind tip of abdomen. Mandibles slender, with a triangular apophysis near tip. Tarsi ending in two claws.

Length 1.2 mm.

Several specimens from Austin, Texas, May; taken from a lizard, *Sceloporus floridana*. I have figured this species on page 22 of my "Treatise on Acarina." It differs much from the other species of the genus in general appearance, but the essential characters, especially the nature of the mandibles, are the same.

Chelidius texan n. sp.

Body about twice as long as broad, tapering each way; much narrowed just behind hind coxae, from thence the posterior sides are parallel, apex truncate. Beak rather short, acute, palpi very heavy, first joint with two simple hairs above, second joint with one above, the papilla bears a comb and two pectinate bristles. At the base of the claw there is a stout tooth. Cephalothorax with a simple bristle in each posterior corner; abdomen with an irregular submarginal row of about eight simple bristles, one on each shoulder, and three each side at tip. Legs quite long and slender, provided with simple bristles, leg I more slender but about as long as leg IV, penultimate joint of leg I is very slender, terminated by two long bristles, and two others near base. The last joint of leg I is short and slender, and furnished with two fine claws.

Length .45 mm.

Specimens from Marblehead, Mass. (M. J. J. Gregory) found feeding on *Trichostema* among cabbage seed. This species is figured on page 28 of my "Treatise" as *C. audax*, a preoccupied name.

Cheyletus pyriformis n. sp.

Body nearly twice as long as broad, broadest at shoulders, broadly rounded at tip. Cephalothorax with a pair of feathered bristles in front, and a pair of broad scales, three similar scales on each side, and a long feathered bristle near each hind angle, four scales forming a square in middle. On dorsum of abdomen are four rows each of three broad scales, and four rather more slender ones at the tip. The basal joints of the legs have each one or two scales and one or two feathered bristles; the bristles near the tips of legs are more simple. The palpus is moderately heavy; the femur is almost angularly swollen on outer side, with a long plumose bristle above on middle; the next joint is fully twice as broad as long, with a long plumose hair near outer edge; the third joint has a simple hair on inner side; the fourth ends in a large claw, with a row of hairs on inner side; the fifth, or papilla, bears two long curved claws, and a long comb below, with a simple bristle arising near base of comb. The beak has a pair of long plumose bristles above. Leg i ends in two long bristles, the longer is twice as long as the tarsus.

Length .35 mm.

Several specimens taken under the grape-vine scale, *Aspidiotus uvæ*, from material collected by Prof. Webster at Lafayette, Indiana, in December. Figured on page 17 of my "Treatise."

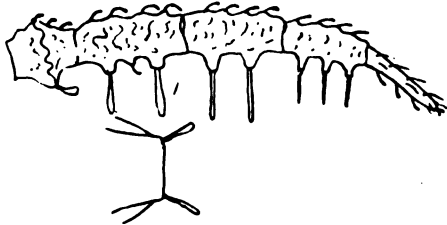


FIG. 15.—*Cæculus clavatus*: leg i, and tip of cephalothorax.

Sarcopterus longipilis n. sp.

Body subquadrate, shoulders not prominent. Dorsum with a broad shield, with sub-parallel sides, and broadly rounded behind, not reaching tip. This shield has each side in front an oblique row of three bristles, and a sub-lateral pair just before, and one just behind the middle. Dorsum outside of shield striate; two long bristles near each shoulder, one near tip each side, and a longer one in front near base of beak. Legs short and robust; i and ii with a few simple bristles, and ending in two claws; leg iii ends in four very long bristles, three of them about as long as the body; leg iv ends in five long bristles, four of them about as long as body. Mandibles with the usual row of serrate teeth above.

Length .3 mm.

Specimens taken from a tumor under the wing of a cross-bill at Washington, D. C., by Dr. A. K. Fisher. Readily separated from the European species by the much longer bristles on legs iii and iv. The adult and larvæ have been figured in my "Treatise on Mites," p. 20.

Cæculus clavatus n. sp.

Yellow-brown, legs dark brown, tarsi iii and iv black. Body with a median shield on front part, the posterior shields less distinct. The hard parts are roughened, and behind are the clavate hairs as in *C. americanus*; in front the cephalothorax has a clavate hair each side, which is longer than the clavate hair on trochaner i. Legs of the size and roughened as in *C. americanus*, all with short curved white clavate hairs, mostly in rows; on leg i, however, there are spines on inner side of femur, tibia, and metatarsus, each upon an elevation; two on femur with clavate tips, two on tibia barely pointed at tips, and three on metatarsus with acute tips; on the outer side below are three similar spines; one on the tibia, and two on the metatarsus. On leg ii on the outer side below are also three of these spines; one on tibia, and two on metatarsus.

Length 1. mm.

Taken among dead leaves, near Washington, D. C. Differs from *C. americanus* in number of spines on leg i, and in that several have clavate tips.

Oribata angustipes n. sp.

Body dark red-brown, legs yellowish. Abdomen subglobose, above with a submedian row each side of eight short, curved bristles, seen under high power these are finely serrate; a pair of similar bristles on base of cephalothorax; pseudostigmatic organ simple, very long and fine, its tip wavy; two pairs of simple bristles on cephalothorax in front. Legs very slender; anterior femora nearly as long as width of body; all with a few hairs, the tibiæ with a longer bristle at tip, and a very long one on each hind femur; genital and anal apertures touching. One claw to each tarsus.

Length .6 mm.

Taken near Mt. Vernon, Virginia, among dead leaves. It is near *O. nodipes* Koch, but has longer bristles on femur iv, the tibia iv is longer, and the hairs on abdomen are thicker. I have figured it on page 69 of my "Treatise on Acarina" under the name of *O. gracilipes*, which name I now find is preoccupied.

Liponyssus americanus n. sp.

Very pale yellowish. Body rather elliptical, but truncate at tip, and slightly pointed in front. Surface minutely and obliquely striate. Dorsum with a broad elongate shield, broadest before middle near shoulders,

tapering behind to narrowly truncate tip; with about 60 to 70 stout bristles above, those near tip longer than others; a submedian and a marginal row of these on the shield. Legs quite short, with many short hairs and bristles. Anal shield elongate, broad and broadly rounded in front, tapering and pointed behind, a pair of short bristles in front and three larger ones behind. Sternal shield between coxæ ii broad, sub-quadrangular, straight behind, convex in front, a bristle near each corner.

Length .45 mm.

Several specimens taken from the arm of a person in Washington, D. C. This species is figured on page 53 of the "Treatise."

Hæmagamasus americanus n. sp.

Pale reddish, or yellowish. Body elongate oval; dorsum with many short stiff hairs. Legs moderately slender, tarsi long and slender, tarsus iv but little longer than i; all legs thickly strewn with short, stiff spine-like hairs or bristles. Leg ii (♀) very slightly thicker than other legs. Anal shield elongate oval, rounded behind, somewhat pointed in front, fully three times as long as anal opening, a pair of bristles near front, one each side of the aperture, and three in a curved row behind. Peritreme very long and but slightly curved.

Length .9 mm.

In nest of a mouse (*Peromyscus eremicus*), in the Santa Rita Mts., Arizona (Hubbard). It is figured on page 54 of the "Treatise."

Macrocheles carolinensis n. sp.

Body reddish, legs yellowish; soft parts white. Body one and two-thirds as long as broad, much narrowed in front, broadly rounded behind. Dorsum smooth, without hairs, nor any on the hind margin. Leg i slender; leg ii noticeably thicker even in female, in the male the lower side of femur ii has two or three rows of several rounded tubercles; at tip of patella below is a sharp projection. The female has the anal plate very broad near base, narrower at base and narrowly rounded behind. The legs bear a few simple hairs.

Length 1.6 mm.

Several specimens from Black Mts., N. Carolina (W. Beutenmüller). I have figured the species on pages 59 and 60 of my "Treatise on Acarina."

Celenopsis americana n. sp.

Body one and a half as long as broad, narrowed in front, broadly rounded behind. Above and below smooth and shining; yellowish. Dorsum with many short fine hairs, two longer hairs each side on posterior margin near tip; two pairs above these on dorsum, one near middle,

the other toward tip; one long hair on each shoulder; on the anterior part of dorsum above second legs is an oblique dark mark. Venter with a groove each side reaching from stigmata obliquely backward and uniting behind anal opening and just before tip. The genital area of female is between the second and third pairs of legs; it is longer than broad, pointed on each side, rounded behind, almost truncate in front, and contains a diamond-shaped opening. There is a transverse ridge between coxæ ii. Leg i slender, ending in a number of stiff hairs; other legs larger and subequal in size. Palpi rather short.

Length .75 mm.

Taken from an Histerid beetle (*Hololepta* sp.) at Washington, D. C., and Indianapolis, Indiana (Blatchley). This species is figured on page 61 of my "Treatise on Acarina."

Seius quadripilis n. sp.

Pale yellowish. Body broadly oval. Dorsum smooth, with four long bristles, one on each shoulder, and a submedian pair behind, also a pair of much smaller bristles on the anterior margin over the mouth-parts. Each long bristle about one-third the length of the body. Legs short and well forward, with only a few hairs, tarsi very slender. Peritreme long, reaching forward in front of coxæ ii. Sternal shield in male very broad, in fact as broad as long, and united behind to the large ventral shield; in the female there is a quadrate genital shield, about as broad as the sternal, and just behind it is the large subtriangular anal shield, also as broad as sternal shield. Behind coxa iv there are on each side two elongate metapodia.

Length .4 mm.

On orange leaves, Eustis, Florida (Swingle). It is figured on page 58 of the "Treatise."

Laelaps mexicanus n. sp.

Pale yellowish. Body elliptical, a little narrowed in front, barely tapering behind. Dorsum smooth, with about sixty stout short bristles, rather broader at tip than on base, and serrate on the apical half of one side. These bristles are arranged in about six longitudinal rows; the two terminal bristles are longer than the others. The legs are quite short leg iv about as long as the body, the others shorter, all with short, simple hairs. Peritreme long and slender. Ventral plate of female broken, only at coxæ iv. On the anal plate are three bristles each side of the anus, a pair behind, and a median one at tip.

Length .5 mm.

From Guanajuato, Mexico (Dugès); with some Coccid material; 12 Aug., 1889. This species is figured on page 58 of the "Treatise."

Lalaps macropilis n. sp.

Pale yellowish. Body elliptical, rather bluntly rounded behind, not narrowed in front. Dorsum irregularly pitted and roughened; provided in the cephalic part with about twelve bristles, short, and not very conspicuous, four in a sub-median row each side; behind with ten very large and long bristles, as long as half the width of body, four pairs of them sub-marginal, the other pair sub-central. Legs rather slender, the hind pair longer than the body, the fore pair nearly as long, the tarsi very slender; all legs provided with quite long fine hairs. Ventral shield of male almost covering entire venter, much broadened behind hind coxæ.

Length .4 mm.

On water hyacinth, Eustis, Florida (Webber). It is figured on page 59 of the "Treatise."

Dinychus americanus n. sp.

Color yellowish, legs paler. Body sub-pyriform. Dorsum densely strewn with sub-circular pits, those in the median area smaller than the others, those on the sides plainly larger than in the European *D. inermis*. Epistoma rather broader at tip than at base, and broadly rounded. Seen from above there is on each side a slight projection between legs i and ii. The peritreme at first runs nearly straight, then bends back on inner side, then curves forward some distance parallel to coxæ ii. Legs slender, short, tarsi long, and ending in a long caroncle. The nymph has a slender sternum, even more slender than in *D. inermis*.

Length .5 mm.

College Station, Texas, in cotton-seed meal. It is figured on page 63 of the "Treatise."

Pigmephorus americanus n. sp.

Pale yellowish. Body sub-oval, almost truncate behind. Dorsum smooth; about 8 long stiff bristles on each side margin, somewhat imbricated; posterior part of dorsum with a sub-marginal row of three long bristles on each side, also a dorso-humeral bristle, and a pair in front, rather widely separate. Segmentation of abdomen quite distinct in middle, not seen on margins. Legs rather slender, but short; with many hairs. The claws of leg i sunken under an apical projection of the tarsus other claws exserted.

Length .25 mm.

Several specimens taken from a fly (*Platycnemis imperfecta*) in the District of Columbia (No. 6984). It is figured on page 77 of the "Treatise."

Disparipes americanus n. sp.

Pale yellowish, anterior border of body hyaline. Anterior part of body semi-circular, posterior part rather more elongate but broadly rounded behind. A long, stout humeral bristle, and four on each posterior side-margin. Legs short and stout, pair iv stouter than others, the

upper edge of femur iv concave, tarsus iv tipped with four long bristles, a longer bristle on the preceding joint above, also one below, and one on tibia above; other tarsi with two claws and a stout branched hair below.

Length .15 mm.

One specimen from a bee (*Halictus venablesii*) from Vernon, British Columbia, September, given me by Mr. E. S. G. Titus. It is figured on page 77 of the "Treatise."



FIG. 16.—*Siteroptes carnea*: dorsal view, and tip of leg.

Siteroptes carnea n. sp.

Bright red. Body about two and one-half times as long as broad sides subparallel; beak moderately long and slender; palpi reaching to tip of beak. Dorsum with about five transverse divisions; the first, separating the cephalothorax, the most distinct; posterior part of abdomen much narrowed and tapering to a rounded tip. No bristles visible above, except two each side at tip of body. Legs stout; hind pairs

remote from front pairs; i and ii rather longer than the others; each with a few long bristles, mostly toward tip; tarsi ending in three forked claws; tarsi i and ii with a short clavate hair above near tip.

Length .28 mm.

Occurs in enormous numbers in the deformed heads of certain grasses (*Spirobolus*) in New Mexico and Utah, and doubtless elsewhere in the West.

Phyllocoptes cornutus n. sp.

Color reddish. Body broad, scarcely two and one-half times as long as broad at base of abdomen, moderately convex. Cephalothorax apparently smooth, produced forward in a broad, median plate, with an acuminate point; this plate when seen in side view looks like a frontal horn.

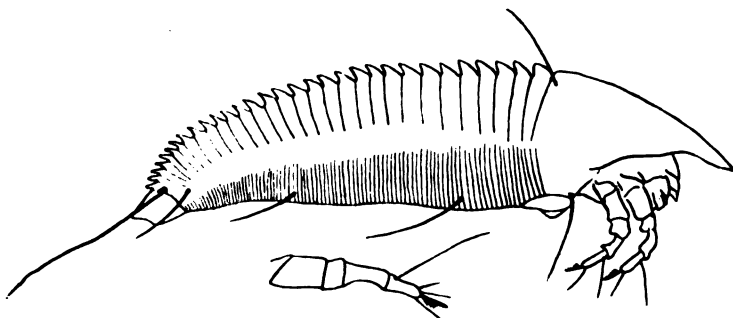


FIG. 17.—*Phyllocoptes cornutus*, and leg i enlarged.

Near the posterior margin of cephalothorax there is a sub-median pair of bristles, not one-half as long as the cephalothorax. Abdomen with about 32 dorsal rings, and fully twice as many ventral ones. Terminal bristles about one-fourth as long as body; three pairs of ventral bristles; one near tip, one before, and one behind middle, first pair longest; also a long pair from coxæ ii. Legs as usual; the long tarsal bristle arises near the base of that joint, but not at extreme base.

Length .13 mm.

On leaves of peach, Washington, D. C. This species lives free on either surface of peach leaves in various parts of the Eastern States. When in numbers it produces a sort of silvery sheen upon the leaf, readily discernible when the light is shining upon it.

Cecidobia n. gen.

An Eriophyid. Dorsal abdominal rings numerous and deeply cut; ventral segmentation almost obliterated; cephalothorax pointed in front, and from the lower median surface there extends downward a curved, black, stiff, rod-like bristle; tarsi ending in a stiff branched hair. Venter with four pairs of bristles, besides longer apical bristles.

Type: *C. salicicola* n. sp.

Differs from all known Eriophyidæ by the prominent median black bristle in front; a most remarkable character, and I know of no explanation of its use. In some species of Epi-trimerus the beak is greatly elongated, but this genus can be distinguished at once from Cecidobia by having the dorsal rings as numerous as ventral ones.

Cecidobia salicicola n. sp.

Dull yellowish. Body broad and short, not three times as long as broad at shoulders. Cephalothorax smooth, triangularly produced in front, a pair of short perfect bristles in front, and a pair of very large and long bristles behind, one near each posterior corner of cephalothorax, and each nearly as long as the body; abdomen with about 35 or 40 deep

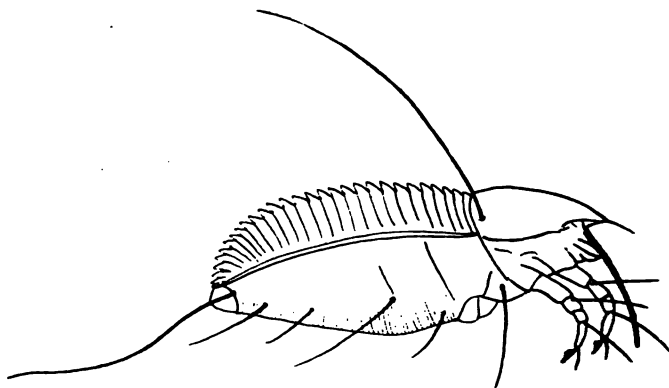


FIG. 18.—*Cecidobia salicicola*.

rings above, extending down but a little way on sides; the telson short; apical bristles fully one-half the length of body. Ventral segmentation obscure, a few fine lines in certain lights, no indentations of margin; four pairs of moderately long bristles below; the second and fourth pairs longer than others, and the second more widely apart at base; a pair of still longer bristles from coxæ ii; dorsal tarsal bristle long, and arising from base of the joint.

Length .10 mm.

Many specimens found in groups of 3 to 10 within recesses of a gall on willow from Ward, Colorado (Cockerell). The gall extends above both surfaces of the leaf, yet not very high.

NOTES ON SCOLYTID LARVÆ AND THEIR MOUTH PARTS.

BY A. D. HOPKINS, PH. D.

In the study of forest insects, and especially in that relating to experimental work with girdled and felled trap trees, it is of the greatest importance to be able to identify the species from the immature stages, yet the published results of accurate work on the larvæ of American Scolytidæ and other important groups of insect enemies and friends of forest trees and their products, is so meager that it is practically of no use to us in our field work. Therefore, it has been necessary to take up the study of the larvæ of the more important species, with a view of preparing tables of characters, for their identification.

The identification of good specific characters of the adults to tabulate for their identification has given me so much trouble and occupied so much time that heretofore it has seemed a hopeless task to undertake systematic work on the larvæ and pupæ, but, in working up material for a monograph on the genus *Dendroctonus*, it became necessary to study the larva, and the results have been so satisfactory that the prospect for success in future studies of the larvæ of other genera and groups is quite encouraging.

The Scolytid larva is of the simple legless type, with slight variation in general appearance; the body segments are rarely with chitinous plates, and, while the living examples present some distinctive characters of form and pubescence, these are obscure and usually lost in alcoholic specimens. Therefore, it was realized that any character, to be of special value, must be found in such chitinous parts as would be readily preserved in alcohol, in cast skins in the pupal chambers, and in dry specimens. This led me to give special attention to the head and mouthparts and other chitinous parts of the body, and has resulted in the determination of some very good characters in *Dendroctonus* and other larvæ. Their value in classifying the species of the genus into natural divisions and series was indicated when, upon tabulating them, I found that the larval characters referred the species into practically the same positions as had the imago characters, and, if anything, had indicated even better natural affinities. This was also verified by the secondary sexual and pupal characters and the characteristics of work and habits, all of which have been tabulated.

The larvæ of thirteen out of nineteen known species of *Dendroctonus* are included in the table of characters. According to these, the species fall naturally into two primary divisions and four sub-divisions, characterized as follows: In the first division, including nine species, the 8th and 9th abdominal segments are without dorsal plates, while in the second division, including four species, they have distinct plates. The first division is further separated by the presence or absence of an elevated ridge near the anterior margin of the epistoma, but the most important character to designate the species is the absence or presence of a frontal elevation and the form and general character of the latter.

In the first sub-division of the second division the dorsal plates of the 8th and 9th abdominal segments are unarmed, while in the second subdivision they are armed with prominent teeth. The more important characters separating the species are found in the frontal area, the clypeus and labrum, all of which are readily observed and recognized in dried specimens, when pinned or mounted on card points. Indeed, if the larvæ are properly treated, even the softer parts are nicely preserved in the dried specimens.

Another character which is of value in separating some of the species is the presence or absence of foot scars on the ventral lobes of the thoracic segments.

In the literature on coleopterous larvæ the mentum, maxillæ, and mandibles have received special attention, while the labrum and the taxonomic importance of its structure and variable parts, has not received the attention it seems to deserve. Packard, in his Text Book of Entomology, appears to be the first to call attention to the importance of the epipharynx, especially in coleopterous larvæ, and expresses surprise that this structure has been overlooked by so many leading entomologists. Considerable information has been published concerning the labrum of insects, especially in its relation to the segments of the head, but as in the general subject of head segmentation, there is a wide range of opinions and conclusions.

In the labrum of the Scolytid larvæ, as in that of representatives of a number of other families of Coleoptera that I have examined, there is a pair of chitinous ventral structures which are of especial interest (Plate IV, Fig. 8). They are attached to, and sometimes extend through, the dorsal exoskeleton of the labrum. In some species they appear on the dorsal surface as black or dark tubercles, which were noted by Heeger in 1854 in certain curculionid larvæ, and briefly referred to and figured in his natural history of insects.

In a longitudinal section, these parts appear as stout, chitinous hooks, resembling somewhat the mandibular hooks in dipterous larvæ—thus they may be referred to as labral hooks. This structure presents some striking variations or modifications in different families, groups, genera, and even in allied species of the same genus. In Scolytidæ there is a striking difference in the structure and form of the clypeus, labrum, and labral hooks in representatives of different genera, primary groups, and sub-families. In *Dendroctonus* (Plates IV and V), the clypeus and labrum are separated by a distinct suture, and the latter appears to be capable of articulation. The labral hooks are prominent in some species and extend back to the base of the clypeus, while in others they are very short, and do not extend to the base of the labrum. In *Platypus* and *Crassotarsus* (the two principal genera of the sub-family Platypodinæ) the clypeus appears to be completely divided and widely separated by the labrum, which occupies a median position and is firmly attached to the epistoma, or second clypeus (Plate V); the apex scarcely extends beyond the apical angles of the first clypeus, from which it is separated by a deep, narrow emargination. The labral hooks appear to be modified into parallel sclerites between the labrum and clypeus, and firmly attached to the second clypeus. The ventral portion of this combination structure is chitinous, strongly convex in the middle, and closely, obliquely sulcate each side, while towards the base it is deeply concave.

In the Corthyli group (sub-family Scolytinæ), including *Corthyli*, *Pterocyclon* (*Monarthrum*), *Tripodendron* (*Xyloterus*), the structure of the clypeus and labrum is intermediate between the Hylesinæ and Platypodinæ, in the fact that the anterior margin of clypeus is obscure or completely coalesced with the labrum, and the labral hooks are parallel.

In *Scolytus muticus* (which, at present, represents another sub-family) the clypeus and labrum are separated by a distinct suture, and the labral hooks extend from the middle of the latter to the middle of the former, curving outward towards the base (Plate V).

There is another feature of the labral hooks exhibited in some species, where the anterior ends appear to be jointed. In *Dendroctonus terebrans* they are also articulated with another pair of similar structures, which appear to belong to the pharynx.

As previously noted, there is a remarkable resemblance between these labral hooks and the mandibular hooks in certain dipterous larvæ. They also appear to be representative of primitive appendages. Perhaps, after all, the labrum may represent a primary first segment or head. At any rate, the

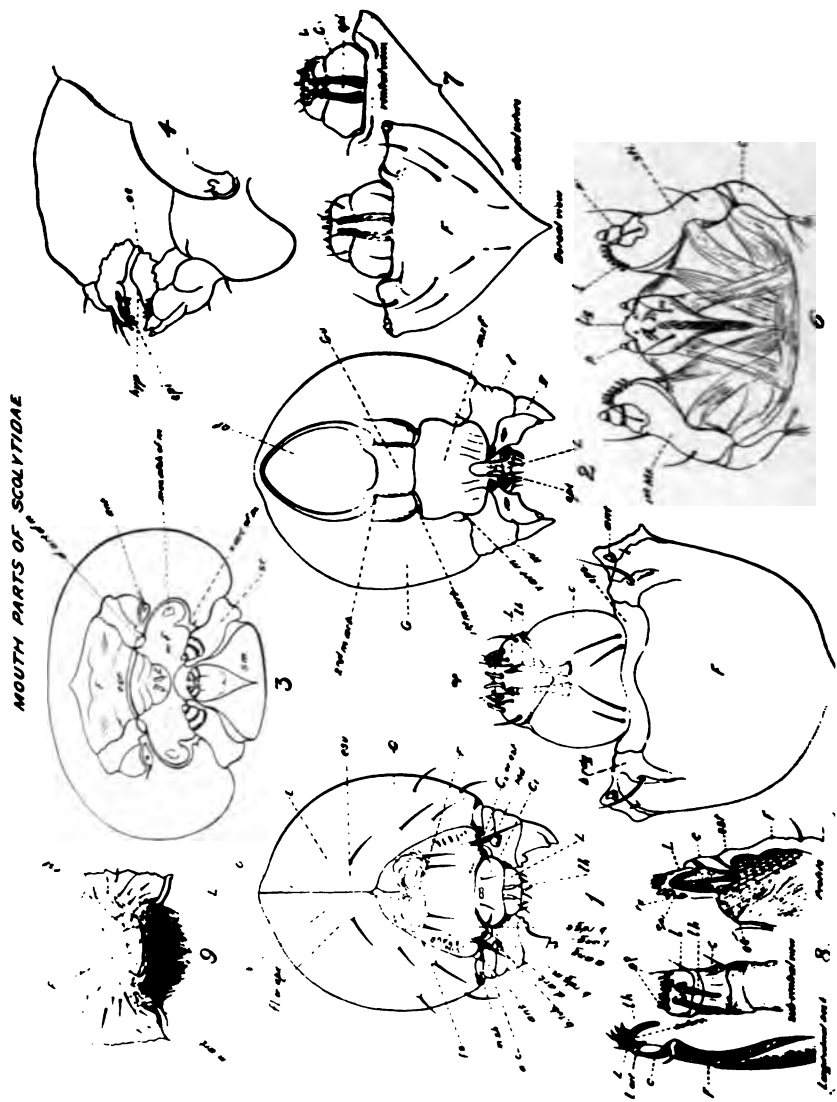


PLATE IV.

labrum and other parts of the anterior area of the larval head, including the epipharynx, possess certain features common to such a wide range of species, that they must be recognized, especially in the coleopterous larvæ, as possessing characters of prime importance for future systematic work, and, it seems to me, offer a rich field for original research.

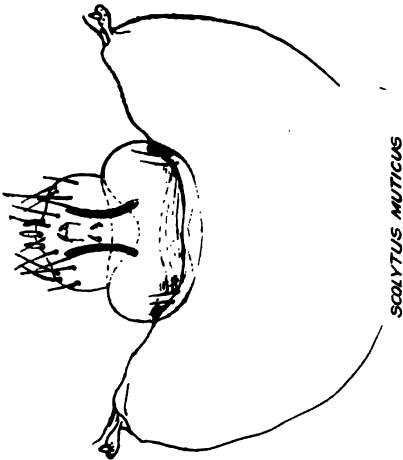
EXPLANATION OF PLATE IV. MOUTHPARTS OF SCOLYTIDÆ.

1. Head of Larva (*Dendroctonus ponderosæ*), dorsal view.
2. Same—ventral view.
3. Same—oral view.
4. Same—lateral view.
5. Same—front, clypeus and labrum.
6. Maxillæ of *D. valens*, showing first and second with muscular structures.
7. Front, clypeus and labrum of *D. terebrans*.
8. Front, clypeus and labrum anatomy of *D. valens*.
9. Front, epistoma and labrum of adult *D. brevicornis*, var. *barberi*.

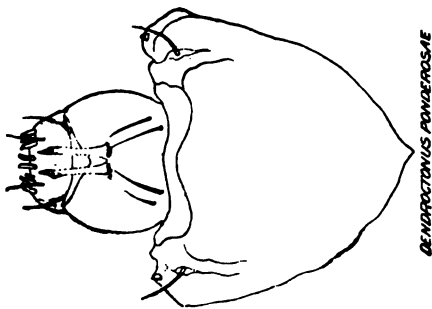
ABBREVIATIONS.

a. ang	Anterior angle of mandible.
ac.	Antecoxal piece.
ant.	Antenna.
ap.	Apical palpi of epipharynx.
b. rdg. e.	Basal ridge of epistoma.
b. rdg. m.	Basal ridge of mandible.
b. tub.	Basal tubercle of mandible.
Cl.	Clypeus.
C. 1.	1st Clypeus.
C. 2.	2d Clypeus.
c.	Cardo.
d. art. of m.	Dorsal articulation of mandible.
E.	Epicranium.
epi	Epipharynx.
est.	Epistoma.
esu.	Epicranial suture.
F.	Front.
fl or ap.	Fontenal (or apex) of frontal area.
fs.	Frontal suture.
G.	Gena.
Gu.	Gula.

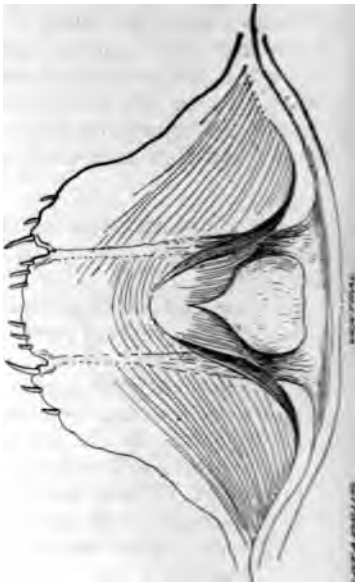
LABRUM OF SCOLYTID LARVÆ.



SCOLYTUS MUTICUS



DENDROCTONUS PONDEROSÆ



SCOLYTUS MUTICUS

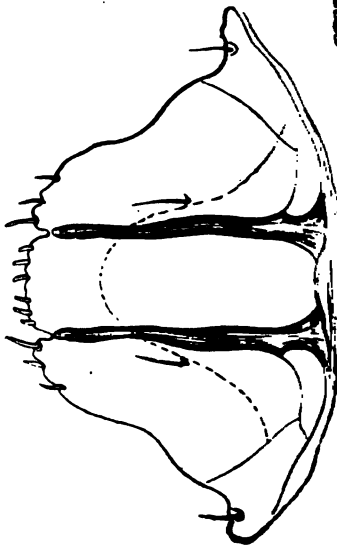


PLATE V. LABRUM OF SCOLYTID LARVÆ.

hyp.....	Hypopharynx.
I, ang.....	Inner angle of mandible.
L.....	Labrum.
l.....	Lacinia.
lh.....	Labral hooks.
l. art.....	Labral articulation.
lig.....	Ligula.
Md.....	Mandible.
m. sh.....	Mandible sheet.
mx.....	Maxillary foramen.
1st. mx.....	1st Maxilla.
2d. mx.....	2d Maxilla, or labium.
O.....	Occiput.
of.....	Occipital foramen.
oe.....	Oesophagus.
p.....	Palpiger.
pl.....	Palpus.
sm.....	Sub-mentum.
sti.....	Stipes.
te.....	Taste palpi.
v.....	Vertex.

SOME NOTES ON THE PROVANCHER MEGACHILIDÆ.

By E. S. G. Titus.

Through the kindness of Abbé V. A. Huard, Curator of the Museum of the Department de l'Instruction Publique, Quebec, Canada, I have had the opportunity of examining the specimens of the Megachilidæ (now in the Museum at Quebec) upon which Abbé Provancher based his determinations.

These specimens have been compared with the Cresson and other types at Philadelphia and with the collections in the National Museum at Washington.

The only references given are those of Abbé Provancher's articles and such others as directly relate to his writings.

The types of the new species unless otherwise stated are in the Museum at Quebec.

MEGACHILINÆ.

Megachile relativa Cresson.

1882: Le Naturaliste Canadien, v. XIII, p. 227, 232, n. 12, 9
(*Megachile optiva* in part).

1883: Fauna Ent. Can. Hym. p. 710, 715, n. 12, ♀ (*Megachile optiva* in part).

1888: Add. Fauna Ent. Can. Hym. p. 462 (*Megachile optiva* in part).

1898: Dalla Torre, Cat. Hym. v. X, p. 438, ♀ (*Provancher* references to *M. optiva* in part.)

One of the two female specimens under the number 877 appears to be referable to Cresson's *relativa* and has been compared with the type.

The clypeus is slightly emarginate, mandibles apparently 4-toothed slightly interrupted band on dorsal abdominal segment 4, bands widely interrupted on segments 2 and 3, missing on first segment (rubbed), edges of abdominal segments with dense pubescence; tarsal claws each with a sharp basal tooth. Recorded by Provancher from "St. Hyacinth, Cap Rouge, etc."; it is of course impossible to determine from which of these localities the above specimen was taken.

Megachile leoni n. sp. ♀.

Same references as above given under *Megachile relativa* apply to this species, the specimen upon which it is founded being the other specimen of "*Megachile optiva*" in the Provancher collection. In general appearance it is near to *relativa*.

Length 9 mm. Pubescence of the insect white and yellow mixed (specimen very dirty); not as dense or as long on the clypeus as elsewhere, dorsal abdominal bands present and entire except on first segment which has the band slightly interrupted, last dorsal segment with rather long black pubescence, other dorsal segments with scattering black hairs on the disk, pubescence of scopa coarse, short and yellow, of tarsi bright orange; punctuation close and coarse, on clypeus not so close nor so deep as on remainder of head; mandibles 5-dentate, teeth obsolete and irregular; clypeus entire; tegulae fuscous, wings slightly embrowned, transverse nervure before basal nervure; last two joints of front tarsi reddish, all the spurs reddish yellow, front claws with a distinct basal tooth; hind claws without, middle legs broken, first tarsal joint on posterior legs flattened, scarcely as broad at tips as at base, not subparallel.

Cypophaga inermis Provancher.

1882: Le Naturaliste Canadien, v. XIII, p. 226, 229, n. 6, ♂ (*M. simplex* Prov.)

1883: Fauna Ent. Can. Hym. p. 710, 712, n. 6, ♂ (*M. simplex* Prov.)

1888: Add. Fauna Ent. Can. Hym. p. 323, n. 6, ♂, p. 462, (*M. inermis* Prov.)

1896: Dalla Torre, Cat. Hym. v. X, p. 449 (*M. simplicissima* D. T.)

This species is very closely related to *M. montivaga* Cresson and I have deemed it advisable to give a rather full description of the one specimen. The species was first named *M. simplex* by Abbé Provancher, but in 1888 he renamed it *M. inermis*, doubtless having become aware that Smith in 1853 had also described a *M. simplex*. Dalla Torre evidently overlooked this name *M. inermis* and renamed the species *M. simplicissima*.

Form subparallel; pubescence mostly white, some black hairs on upper part of cheeks near eyes and on dorsal abdominal segments where it is rather dense, pubescence of thorax white somewhat mixed with ochraceous on the dorsum, face and cheeks with long white hairs, tarsi clothed with yellowish pubescence, dorsal abdominal bands close and appressed, absent on first segment, widely interrupted on second segment (rubbed?), first and second segments clothed with a loose gray pubescence; punctuation regular and close, that on scutellum exceedingly close rather large and with the ground surface tessellated; head very broad and extending well behind the eyes, antennæ simple, with a tendency to be crenulated beneath, fuscous beneath; mandibles long, subparallel, black with a red band across outer tooth and on inner teeth at tips, 3-toothed, first tooth long and sharp, middle tooth shortest, a long, flattened, rounded and turned inward at tip, basal tooth, cheeks apparently not armed; labrum truncate at tip (in *pugnata* it is notched); tegulæ reddish-black; a central smooth slightly elevated line on anterior mesothorax, wider posteriorly and reaching almost from tegulæ to apical margin; transverse nervure interstitial; femora reddish inside; claws cleft, with an enlargement but no basal tooth; 6th dorsal segment with a prominent carina, shallowly, broadly emarginate, apical carina thin and almost obsolete, lateral teeth flattened in axial plane of body and bent inward, round at tip, 7th segment produced and with a faint emargination at tip; no coxal spines.

Redescribed from one ♀ specimen numbered 873, and recorded by Provancher.

Megachile vancouverensis Provancher. ♂.

1888: Add. Fauna Ent. Can. Hym. p. 425, n. 3, p. 457.

1896: Dalla Torre, Cat. Hym. v. X, p. 451.

In shape very much like *M. avara* Cresson, but is wider, has more pubescence on abdomen, thus making it appear grayer.

Pubescence long and white, mixed with brown on the vertex and on front of thorax almost back to tegulæ, short black hairs on outer orbits of eyes, reaching about half way from vertex to base, cheeks back of this portion have some black hairs mixed with short white ones, segments 3, 4, 5 with more or less brown or black hairs on dorsum; middle tarsi densely clothed above and hind tarsi beneath with short yellow pubescence, some black hairs above on all the tibiæ; pubescence of all the femora long and white, first four joints of tarsi fringed with long white hairs, some of which have brown tips, first joint concave, yellowish red

beneath, darker above, with the upper edge quite black, each margin fringed with short coarse brownish red hairs, second, third and fourth joints with short coarse hairs on edges, all of the joints have short flattened lobes projecting beyond the apex, claw joint ferruginous as long as three before it combined, claws black at base of cleft, tips ferruginous; anterior coxæ with well developed black spines, tipped with red, subapical spines ferruginous, trochanters and coxæ black; front and middle femora slightly swollen, all the femora reddish beneath, the first with the portion where the tibia rests when closed against it smooth and highly polished, yellowish-red, front tibiæ same color as femora, also polished and with a marginal fringe of white hairs; punctures of head and thorax rather fine and close, on abdomen sparse; antennæ black, last joint flattened but not expanded; mandibles 4-toothed, straight above, toothed below at base, black, punctured, inner and outer teeth with reddish marginal lines; clypeus with very fine punctures, edge impunctate, polished, with a central emargination and having on each side two teeth; second joint of labial palpi slightly longer than first; maxillary palpi 3-jointed, bare, basal joint broadest, a white bristle at tip of third joint, this joint tapers from base to tip; 6th dorsal abdominal segment with a compressed carina, broadly, shallowly emarginate, edges slightly broken or irregularly serrate, apical carina thin with two long rounded distant teeth, 7th segment not at all visible; cheek armed with a scale-like process.

Redescribed from one specimen numbered 1417 and reported by Provancher to have been received from "Vancouver (Taylor)." This is a very peculiar species and does not belong in *Megachile* s. str.

Anthemois addenda Cresson.

1888: Add. Fauna Can. Ent. Hym. p. 462 (*acuta* given as syn. of *latimanus*).

I have examined one ♀ labelled *Megachile acuta* and presume that the above reference is to this specimen. The specimen is numbered 1113 and also bears the number 188. It is distinctly referable to Cresson's *M. addenda*.

Anthemois infragilis Cresson.

1883: Le Naturaliste Canadien, v. XIV, p. 37, n. 5, ♂ (*Osmia frigida*).

1888: Add. Fauna Can. Ent. Hym. p. 325, ♂, 462 (*Osmia frigida*).

1896: Dalla Torre, Cat. Hym. v. X, p. 395 (*Osmia frigida*, Prov. references, ♂ only). I have examined one specimen of this species, numbered 1061 and labelled *Osmia frigida*. It is a typical specimen of Cresson's *infragilis*. Provancher in 1888, in his references to the above species on p. 324, described the female, but I have not seen the specimen nor can I recognize it from his description.

[TO BE CONTINUED.]

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SOME NOTES ON THE PROVANCHER MEGACHILIDÆ.

By E. S. G. Titus.

[Continued from page 152.]

Xanthosarus vidua Smith.

1882: Le Naturaliste Canadien, v. XIII, p. 226, 227, n. 3, ♂ (*M. scrobiculata*); p. 226, 230, n. 8, ♀ (*M. grandis*); p. 227, 240-241, n. 10 (*M. centuncularis*).

1883: Fauna Ent. Can. Hym. p. 710, 711, n. 3, ♂ (*M. scrobiculata*); p. 710, 713-714, n. 8, ♀ (*M. grandis*); p. 710, 714-715, n. 19, ♀ (*M. centuncularis*);

1888: Add. Fauna Ent. Can. Hym. p. 462 (species as above noted).

1896: Dalla Torre, Cat. Hym. v. X, p. 425 (*M. centuncularis*, Prov. references); p. 445 (*M. scrobiculata* as syn. of *pugnata*, Prov. references); p. 444 (*M. grandis* under *M. pollicaris* Prov. references).

The specimen marked *M. grandis* is numbered 874 and the locality at present unknown. The ♂ marked *M. scrobiculata* bears the number 871 and it also has no known locality at present. One ♀ numbered 876 and labelled *M. centuncularis* is doubtless from Provancher's locality "CC." I have not added above in the references to *M. centuncularis* the following two as I have no means of knowing to what species he refers.

1877: Le Naturaliste Canadien, v. IX, p. 23, 95.

1886: " " v. XVI, p. 34.

Xanthosarus melanophæa Smith.

1882: Le Naturaliste Canadien, v. XIII, p. 226, 228, n. 4, ♂ (*M. femorata*), p. 227, 232, n. 13, ♀ (*M. melanophæa*).

1883: Fauna Ent. Can. Hym. p. 710, 712, n. 4, ♂ (*M. femorata*); p. 710, 715-716, n. 13, ♀ (*M. melanophæa*).

1888: Add. Fauna Ent. Can. Hym. p. 462 (species as noted above).

1896: Dalla Torre, Cat. Hym. v. X, p. 420 (*M. femorata*, Prov. references); p. 438 (*M. melanophæa*, Prov. references).

1903: Friese, Zeits. Hym. Dip. v. III, p. 248 (*M. canadensis*).

The specimen labelled *M. femorata* is numbered 872, locality unknown, the ♀ labelled *M. melanophæa* is numbered 878 and is from "C."

Xanthosarus femorata Smith

1882: Le Naturaliste Canadien, v. XIII, p. 226, No. 27, n. 1, ♂ (*M. latimanus*).

1883: Fauna Ent. Can. Hym. p. 710-711, n. 1, ♂ (*M. latimanus*).

1888: Add. Fauna Ent. Can. Hym. p. 462 (*M. latimanus*).

1896: Dalla Torre, Cat. Hym. v. X, p. 436 (*M. latimanus*, Prov. references, ♂ only).

One specimen numbered 870, labelled *M. latimanus* appears to be referable to *X. femorata* Sm. It is from either St. Hyacinth or Cap Rouge as Provancher reports the species from both localities.

I have not added above the reference to the ♀ of *latimanus* given by Provancher because I have seen no specimens so labelled.

1888: Add. Fauna Ent. Can. Hym. p. 324, n. 9, ♀ (*M. latimanus*). Nothing can be told from the description, which appears to be founded on some *Xanthosarus*.

Xanthosarus latimanus Say.

1882: Le Naturaliste Canadien, v. XIII, p. 226, 227-228, n. 2, ♂ (*M. frigida*); p. 227, 231, n. 11, ♀ (*M. mendica*).

1883: Fauna Ent. Can. Hym. p. 710, 711, n. 2, ♂ and ♀, p. 710, 715, n. 11, ♀ (as above).

1888: Add. Fauna Ent. Can. Hym. p. 462, (*M. frigida* and *M. mendica*).

1896: Dalla Torre, Cat. Hym. v. X, p. 431, ♂ (*M. frigida*, Prov. references); p. 439, ♀ (*M. mendica*, Prov. references).

Megachile frigida is reported by Provancher from St. Hyacinth and *M. mendica* from Chicoutimi. A specimen labelled *M. frigida* bears the number 1012 and one labelled *M. mendica* is numbered 1013.

Sayapis, new name for *Gnathocera* and *Cerantias* both preoccupied.

1882: Le Naturaliste Canadien, v. XIII, p. 232 (*Gnathocera*, type: *cephalica*).

1883: Fauna Ent. Can. Hym. p. 689, 716 (*Gnathocera*, type *cephalica*).

1888: Add. Fauna Ent. Can. Hym. p. 323 (same ref.)

1896: Dalla Torre, Cat. Hym. v. X, p. 417 (as a syn. of *Megachile*).

1903: Robertson, Tr. Amer. Ent. Soc. v. XXIX, p. 167, 172 (*Ceratias*, type *pugnata*).

It is rather unfortunate that this genus should have had two preoccupied names given to it. *Gnathocera* was used by Kirby in 1825 for a genus of Coleoptera; *Ceratias* was used by Kroy in 1845 for a genus of Fishes.

Sayapis pugnata Say.

1882: Le Naturaliste Canadien, v. XIII, p. 233, ♀ (*Gnathocera cephalica*); p. 226, 228-229, n. 5, ♂, ♀ (*M. pugnata*).

1883: Fauna Ent. Can. Hym. p. 710, 712, n. 5, ♂ ♀ (*M. pugnata*); p. 716, ♀ (*Gnathocera cephalica*).

1888: Add. Fauna Ent. Can. Hym. p. 323, n. 5, p. 462 (makes *G. cephalica* a syn.).

1896: Dalla Torre, Cat. Hym. v. X, p. 445 (*M. pugnata*, Prov. references and *G. cephalica* which he makes a syn. of *pugnata*).

I have seen but one pair of this species, they are numbered 196 (or 961). Provancher reports the species from Cap Rouge. It is of course impossible to state which of the references are applicable to these particular specimens, but since Provancher himself made *Gnathocera cephalica* a synonym of *M. pugnata* we may feel assured that the originals were carefully compared.

OSMIINÆ.

Osmia lignaria Say.

1882: Le Naturaliste Canadien, v. XIII, p. 207-208, n. 1, ♀, ♂.

1883: Fauna Ent. Can. Hym. p. 707, 708, n. 1, ♀, ♂.

1888: Add. Fauna Ent. Can. Hym. p. 466.

1896: Dalla Torre, Cat. Hym. v. X, p. 410, ♀ (Provancher references).

I have examined ♀ ♀ numbered 867 and labelled *Osmia lignaria*. No specimens of the ♂ were seen.

Osmia similima Sm.

1883: Fauna Ent. Can. Hym. p. 812, n. 6, ♀ (*Osmia atriventris*).

1888: Add. Fauna Ent. Can. Hym. p. 466 (*Osmia atriventris*).

1896: Dalla Torre, Cat. Hym. v. X, p. 385, ♀ (*Osmia atriventris*, Prov. references).

One ♀ specimen bearing the number 1066 and marked *Osmia atriventris* belongs to *Osmia simillima* ♀. I have had opportunity of consulting Prof. Cockerell's notes made on an examination of the type of *O. simillima* in the British Museum and am satisfied that this specimen belongs to that species. Provancher gives Toronto as the locality of capture.

Osmia atriventris Cresson.

1882: Le Naturaliste Canadien, v. XIII, p. 207, 208, n. 2, ♀ (*O. simillima* in part).

1883: Fauna Ent. Can. Hym. p. 707, 708, n. 2, ♀ (*Osmia simillima* in part).

1888: Add. Fauna Ent. Can. Hym. p. 325, ♀, p. 466, (*Osmia simillima* in part); p. 325, 329, n. 15, ♂, p. 467 (*Osmia vicina*).

1896: Dalla Torre, Cat. Hym. v. X, p. 410, ♀ (*O. simillima*, Prov. references); p. 414, ♂ (*O. vicina*, Prov. references).

A specimen numbered 1161 and labelled, not with the regular oblong label used by Provancher, but on a narrow strip, *Osmia simillima*, can be referred to this species. Provancher reports *O. simillima* from "C." A ♂ numbered 1162, and labelled *Osmia vicina* appears to be the ♂ of *atriventris*. Provancher reports *O. vicina* from Ottawa at flowers of *Cypripede*. The ♀ is also listed by Provancher in 1888 under n. 15, but I have not seen the specimen.

Osmia brevis Cresson.

1888: Add. Fauna Ent. Can. Hym. p. 324, 326, n. 8, ♀, p. 466.

1896: Dalla Torre, Cat. Hym. v. X, p. 388. (Provancher references only).

One ♀ numbered 868 and correctly determined. Reported from Cap Rouge by Provancher.

Osmia nigrifrons Cresson.

I have examined one ♀ of this species in the Provancher material numbered 1526 and labelled *O. nigrifrons*.

Melanosmia grandior Kll. (*Osmia longula* Prov.).

In the Provancher material sent me there is a ♀ numbered 1525 and 13, and labelled *Osmia longula*, which is referable to Cockerell's *O. grandior*.

Chalcosmia chalybea Smith.

1888: Add. Fauna Ent. Can. Hym. p. 325, 326, n. 10, p. 466 (*Osmia faceta*)

1896: Dalla Torre, Cat. Hym. v. X, p. 394 (*O. faceta*, Provancher references).

One ♀ specimen numbered 1160 and labelled *Osmia faceta* has been compared with Smith's description and Cockerell's MS. notes on the type of *O. chalybea* and is undoubtedly that species. Provancher records his species from Cap Rouge.

Leucosmia albiventris Cresson.

1882: Le Naturaliste Canadien, v. XIII, p. 207, 208, n. 2, ♀ (*O. simillima* in part).

1883: Fauna Ent. Can. Hym. p. 707, 708, n. 2, ♀ (*O. simillima* in part).

1888: Add. Fauna Ent. Can. Hym. p. 325, ♀, p. 466 (*O. simillima* in part); p. 325, 327, n. 11, ♀ p. 466 (*O. albiventris*).

1896: Dalla Torre, Cat. Hym. v. X, p. 384, ♀ (*O. albiventris*, Prov. references); p. 410, ♀ (*O. simillima*, Provancher references).

One ♀ numbered 1161 and labelled *Osmia simillima* is referable to this species as is also a ♀ correctly labelled and numbered 1163. *O. albiventris* is recorded by Provancher from Cap Rouge. The ♂ which he records I have not seen.

Leucosmia parvula Dalla Torre.

1882: Le Naturaliste Canadien, v. XIV, p. 37, n. 7, ♂ (*Osmia parva*).

1883: Fauna Ent. Can. Hym. p. 812, n. 7, ♂ (*O. parva*).

1888: Add. Fauna Ent. Can. Hym. p. 325, n. 7, ♂ p. 467 (*O. parva*).

1896: Dalla Torre, Cat. Hym. v. X, p. 405, ♂ (*O. parvula*, n. n. for *parva*).

Length 4.5 mm. Small, blue-green, legs and antennæ reddish fuscous; pubescence very white, that on face and thorax very dense, sides of abdomen fringed, first and second dorsal abdominal segments with scant pubescence, front femora and tibiæ with long white fringe, not so dense and shorter on other legs; punctuation fine and close, mandibles very dark, two-toothed, spurs dark red, tegulæ reddish; basal nervure before transverse median; claws deeply cleft; 6th and 7th dorsal abdominal segments deeply incised at apex, edge of 6th segment slightly turned up and ferruginous along the thin edge, the blue color of the segment runs out onto the points of the teeth, thus interrupting the ferruginous edge.

Redescribed from one ♂ specimen numbered 1062 and labelled *Osmia parva*. This is a very small species, very dainty in shape. No locality is given for the species. This was re-named by Dalla Torre on account of Radoszkowski's species *parva* 1874.

Monilosmia canadensis Cresson.

1888: Add. Fauna Ent. Can. Hym. p. 325, 329-330, ♂ p. 466 (*Osmia proxima*).

1896: Dalla Torre, Cat. Hym. v. X, p. 496 (*O. proxima*, Provancher references).

One ♂ specimen numbered 1164 and labelled *O. proxima*. Provancher reports the species from "Ottawa (Guignard)."

Centrosmia bucephala Cresson.

1882: Le Naturaliste Canadien, v. XIII, p. 207, 208, n. 3, ♀ (*O. lignicola*).

1883: Fauna Ent. Can. Hym. p. 707, 708, n. 2 (*O. lignicola*).

1888: Add. Fauna Ent. Can. Hym. p. 324, 466 (*O. lignicola*); p. 325, 327-328, n. 13 (*O. latitarsis*).

1896: Dalla Torre, Cat. Hym. v. X, p. 399 (*O. latitarsis*, Provancher references); p. 491, ♀ (*O. lignicola*).

The type of *O. lignicola* is numbered 965 and Provancher records it from Cap Rouge, the species *O. latitarsis* is numbered 1168, and is also from Cap Rouge.

Centrosmia tarsata Provancher.

1888: Add. Fauna Ent. Can. Hym. p. 325, 328, n. 14, ♂, p. 467 (*Osmia tarsata*).

1896: Dalla Torre, Cat. Hym. v. X, p. 412 (*Osmia tarsata*).

Length 9 mm. Rather slender, blue-black, abdomen shining blue, antennæ deep brown, head with a greenish cast in some lights, margins of all the dorsal abdominal segments brownish, polished, and not punctured, first two pairs of legs blue-black (hind legs missing) 2d ventral segment reddish with a tendency in the center of the apex towards an upraised tooth; pubescence of face white and dense, dorsum of thorax with pubescence somewhat ochraceous (has been wet and is matted on the surface), first two dorsal abdominal segments, head and pleura with white pubescence; edges of segments with scarce pubescence ochraceous and black intermixed, pubescence of legs white on tibiæ and ferruginous on tarsi; antennæ long rather slender, neither 3d nor 4th joint equals 1 + 2; mandibles polished, apical tooth very sharp; legs finely punctured, tarsi of middle legs deformed as in *C. bucephala* but are more slender and not so broadly deformed as in that species; outer spine of tibiæ long and sharp, somewhat curved, spurs dark, one much longer than the other on hind legs; 6th dorsal segment minutely emarginate in the central margin and slightly sinuate at sides, 7th segment notched sharply and deeply on apical margin, teeth pointed, 3d ventral showing in the form of lobes at the sides of and behind the 2d ventral which has a small upraised tooth on the center of its apical margin, 4th ventral with sides curved and tip broadly truncate; first submarginal cell nar-

rowed above, both recurrent nervures entering cell at about equal distances from apex and base, transverse median nervure only slightly before the basal nervure, veins brownish, wings slightly clouded.

The single ♂ is numbered 1169 and recorded by Provancher from Cap Rouge.

Nothomsia exigua (?) Cresson.

1888: Add. Fauna Can. Ent. Hym. p. 326, ♂ p. 339, 466 (*Osmia exigua*). No specimens of this species were sent for examination and it is very doubtful if the species was correctly recognized. The "*Osmia parva*" Prov. would come the nearest to the species of any specimens I have seen from Canada.

Monumetha albifrons (Kirby).

1837: W. Kirby, Fauna Bor.-Amer. v. IV, p. 270, n. 374, ♂.

1882: Le Naturaliste Canadien, v. XIII, p. 227, 240-241, n. 10 (*Megachile oblonga*).

1882: Le Naturaliste Canadien, v. XIII, p. 226, 230, n. 9, ♀ (*Megachile oblonga*).

1883: Fauna Ent. Can. Hym. p. 714, n. 9, ♀ (*Megachile oblonga*).

1888: Add. Fauna Ent. Can. Hym. p. 324, 326, n. 9, p. 467 (*Osmia oblonga*).

1896: Dalla Torre, Cat. Hym. v. X, p. 404, ♀ (*Osmia oblonga*).

There is in the Provancher collection the type of *Osmia oblonga* Prov., a single ♀ specimen numbered 962, that is a well marked specimen of Cresson's "*Monumetha argentifrons*," which species I now believe to be synonymous with Kirby's *Chelostoma albifrons*. This last named species was described from one male captured in latitude 65°, North America. I have recently examined specimens collected by Merritt Cary of the Division of Biological Survey, U. S. Department of Agriculture, at Ft. Resolution, Great Slave Lake, Mackenzie Ter., Dom. of Can., 26 June, 1903, which answers to Mr. Kirby's description so closely that I cannot do otherwise than consider them to belong to *albifrons*. Both ♀ ♀ and ♂ ♂ are represented and a comparison with other specimens of the genus *Monumetha* gives no good specific differences. It will be recalled that Mr. Cresson noticed the resemblance between his *M. borealis* (Great Slave Lake) and Kirby's species.

Monumetha imperfecta Provancher, 1896.

1896: Le Naturaliste Canadien, v. XXIII, p. 9, n. 1, ♀.

I have not seen the type of this species which was collected at Los Angeles, Cal., by Mr. D. W. Coquillett. The specimen

was sent to Abbe Provancher by Mr Coquillett who does not now remember whether it was returned or not. From the description the species appears to be a specimen of *Monumetha albipennis* Kby.

Alcidames buccornis Cresson

1881: Le Naturaliste Canadien, v. XIII, p. 207, 208, n. 4.
= *Osmia buccornis*

1883: Fauna Ent. Can. Hym. pp. 707-708, n. 4. = (*Osmia buccornis*)

1888: Add. Fauna Ent. Can. Hym. p. 325. = p. 466 (*Osmia buccornis*)

1896: Dalla Torre, Cat. Hym. v. X, p. 388.

Specimens of this species in the Provancher collection are numbered either 860 or 608 and labelled *Osmia buccornis* Say, and were reported by Abbe Provancher from Cap Rouge.

Alcidames alboscopatum Provancher

1888: Add. Fauna Ent. Can. Hym. p. 425, n. 2, 457. =
Heriades alboscopatum

1896: Dalla Torre, Cat. Hym. v. X, p. 374. = (*Heriades alboscopatum*)

Length 6 mm. Black, about the size and shape of *Microstelis lateralis*, finely closely punctured, except elytra on which the punctures are coarse. Dusted with fine white pubescence, vertex of head and disk of thorax almost bare but with scattering pubescence, face, cheeks, pleura and thorax beneath thickly dusted, first tarsal joint clothed densely beneath, abdominal segments 1-4 with narrow apical hair bands, interrupted to segment 5, missing to segment 6, sides of all the segments fringed, scopa very scanty, elytra with minute indentation in central apical margin, a tuft of hair projecting from beneath on each side, mandibles reddish at tips, two teeth fully visible, antennae fuscous beneath; legs reddish-brown, only the front leg, the middle leg minus claws, one hind leg and femora of the other present, tegulae tinged with red, veins of wings fuscous, wings very slightly cloudy.

Redescribed from one ♀ specimen in the Provancher collection numbered 1301 and reported by Provancher from Cap Rouge.

This is a very neat little species, and is apparently a good species of *Alcidames*. The teeth of the mandibles are not fully visible, but the wing-venation and structure of base of first abdominal segment will place it in this genus.

1888: Add. Fauna Ent. Can. Hym. p. 331-332, n. 24, p. 445. ♀ *Alcidames pilosifrons*. Provancher's descriptions above noted may be considered as placing the species referred to in the above reference under this species. I have not seen the specimens which he states are from "Ottawa (Harrington)." "

Andronicus cylindricus Cresson.

1882: Le Naturaliste Canadien, v. XIII, p. 226, 229-230, n. 6, ♀ (*Megachile brevis*).

1883: Fauna Ent. Can. Hym. p. 710, 713, n. 7, ♀, ♂ (*Megachile brevis*).

1888: Add. Fauna Ent. Can. Hym. p. 324, 327, n. 12, p. 467, ♀ (*Osmia spoliata*): p. 462 (*Megachile brevis*).

1896: Dalla Torre, Cat. Hym. v. X, p. 412, ♀ (*Osmia spoliata*); p. 422, ♀ (*Megachile brevis*, Prov. references).

I have examined two females, one numbered 1478 and labelled *Osmia spoliata* Prov., the other 1014 and labelled *Megachile brevis*. Although Provancher in 1883 refers to the ♂ of *Megachile brevis* there are no specimens in the material sent me. Since the ♂ of this species is so readily separated from others closely related by the shape of the antennæ it is likely that the reference is to another species.

1888: Add. Fauna Ent. Can. Hym. p. 330-331, n. 23, ♂, p. 447, (*Andronicus cylindricus*). The above reference is to a species reported from Ottawa and Cap Rouge by Provancher. I have not seen the specimens mentioned, but the reference is doubtless correct, since the ♂ of this species is easily recognizable.

HERIADINÆ.

Heriades carinatum Cresson.

1882: Le Naturaliste Canadien, v. XIII, p. 233-234, ♀, ♂.

1883: Fauna Ent. Can. Hym. p. 717, ♀.

1888: Add. Fauna Ent. Can. Hym. p. 457.

1896: Dalla Torre, Cat. Hym. v. X, p. 375, ♀ (Provancher reference).

I have examined two ♀♀ and one ♂ of this species, numbered 879 and recorded from Cap Rouge and St. Hyacinth.

Chelostoma ? californicum Cresson.

1895: Le Naturaliste Canadien, v. XXII, p. 190, ♀, ♂ (*Heriades albicinctum*).

There is a single ♂ specimen in the Provancher collection, that I have seen. Provancher mentions and describes both ♂ and ♀ and records them from Los Angeles, Cal., collected by Mr. D. W. Coquillett. The male bears the number 1733. The female described by Provancher has two teeth on the clypeal margin and a white scopa.

STELIDINÆ.

Chelynia Provancher.

1888: Add. Fauna Ent. Can. Hym. p. 322, n. 22 (in *Panurgidæ*, type *labiata*).

1896: Dalla Torre, Cat. Hym. v. X, p. 180 (in *Panurgidæ*).

1898: Ashmead, Psyche, v. VIII, p. 283 (*Melanostelis*, type *betheli*).

This genus was founded on "*labiata* n. sp.," which is identical with Cresson's *nitida*. I have examined Cresson's type specimen, Provancher's type of the genus, and specimens of Ashmead's genus *Melanostelis*.

The Cockerell species placed in this genus do not belong here as can be readily seen by an examination of the descriptions, which show that they are not *Stelidinae*. Provancher very distinctly states that the abdomen of *labiata* is banded, referring to *color-bands*.

Chelynia nitida Cresson.

1888: Add. Fauna Ent. Can. Hym. p. 322, ♀, ♂, p. 450 (*Chelynia labiata*).

1896: Dalla Torre, Cat. Hym. v. X, p. 180 (*Chelynia labiata*).

The species in the ♂ at least is identical with Cresson's *nitida*, the types having been compared. They are almost exactly the same size; the ♀ type of Provancher has not been seen. The species was collected in "Ottawa".

Stelis fæderalis Smith.

1888: Add. Fauna Ent. Can. Hym. p. 336, ♀, ♂, p. 472.

The single specimen in the collection that I have examined is unfortunately minus its abdomen. It appears to be a *Chelynia* and perhaps is *nitida* Cr. It bears the numbers 1114 and 22 and the species is reported by Provancher from "Ottawa (Guignard)."

Microstelis lateralis Say.

1888: Add. Fauna Ent. Can. Hym. p. 425, n. 3, ♂, 457. (*Heriades plenum*).

1896: Dalla Torre, Cat. Hym. v. X, p. 379 (*Heriades plenus* D. T.).

The single male examined is numbered 1637 and is recorded by Provancher from "Ottawa (Guignard)." It has three dots on each side of first three segments, a line on each side of each of the segments 4 and 5, these lines being short and rather nearer the centre than the outside; recurrent nervure interstitial, veins brown, tegulae black, hairy and punctured; face and body very slightly pubescent; legs brownish; front of first segment of abdomen polished, not punctured and with an abrupt ridge above.

Microstelis maculatum Provancher.

1888: Add. Fauna Ent. Can. Hym. p. 323, ♀ pp. 435, 457 (*Heriades maculatum*).

1896: Dalla Torre, Cat. Hym. v. X, p. 378 (*Heriades maculatum*).

Length 4 mm. Black; pubescence white with a few scattered hairs black on thorax; rather finely punctured, tegulae coarsely punctured; and with a fuscous spot, tibiae and tarsi tinged with reddish, claws cleft, spurs pale yellow; antennae fuscous; an oblong yellow macula on each side of segments 1-3 dorsally; clypeus slightly emarginate; 2d joint of labial palpi slightly longer than the first; wing veins fuscous, 1st recurrent nervure fails to reach the submarginal cells in either wing, 2d recurrent nervure uniting at apex or very slightly beyond apex of second submarginal cell, 1st submarginal cell longer than second, basal nervure interstitial, wings slightly cloudy.

Redescribed from the type specimen, a male, in Provancher collection, and numbered 1105 and 40, and recorded as having been collected by Taylor at Vancouver, B. C.

ANTHIDIINÆ.

Anthidium collectum Huard.

1896: Le Naturaliste Canadien, v. XXIII, p. 9, ♂ (*Anthidium compactum*).

1896: Huard, Le Naturaliste Canadien, v. XXIII, p. 123-124 (*Anthidium collectum*).

Length 10 mm. Black with deep yellow markings; pubescence sparse, mostly white, griseous on dorsum of thorax; yellow on clypeus, sides of face to just above base of antennae, mandibles except black tips and margins, elongate spot above each eye, tegulae with spot before and smaller one behind, minute spot on base of wing, minute spot below tegulae, all tibiae with exterior stripes, not broad except on anterior pair, and at apex of middle pair, interrupted on posterior pair in the middle, first tarsal joint with outer stripe, all abdominal bands interrupted in the middle, that on segment 6 swollen into two large spots, segments 1-3 interrupted on sides, 3 only slightly so on left side in one specimen, central spots on first segment minute, bands on segments 4-5 deeply emarginate, antero-laterally, outer portions much the largest; last tarsal joint red, claws bifid but not deeply swollen at base, with a black band across the middle; 6th dorsal segment with sharp lateral spines, 7th trilobed, exterior lobes broad and straight outwardly black, central spine black, short.

Redescribed from the one male specimen in the Provancher collection numbered 1729 and from 5 male specimens in the U. S. National Museum collection. All these specimens were collected by D. W. Coquillett in July in Los Angeles Co., Cal. The specimen in the Provancher collection is headless. Huard renamed this species, *compactum* being preoccupied by *compactum* Smith.

Anthidium tricuspidum Provancher.

1896: Le Naturaliste Canadien, v. XXIII, p. 10, ♂.

Length 11-12 mm. Black with ferruginous and deep yellow markings; pubescence white, rather sparse; the following parts yellow, clypeus, sides of face to just above base of antennæ, mandibles except black tips and margins, circular spot behind eyes at summit, tegulæ with large spot before and small one behind, minute spot at base of wing, elongate spot below tegulæ, two lines on border of scutellum, spot on middle and hind coxæ behind continued onto sides outwardly, all the tibiæ with broad stripes outwardly, first tarsal joint with broad outward stripe, first joint of middle and posterior tarsi with a spot on outside, narrow bands on all femora at apex, spot on side at apex of anterior pair, abdominal segments 1 and 2 with four nearly equidistant spots, inner ones on segment 1 small, segments 3 and 4 with bands sharply emarginate in middle and at sides, 3-6 slightly notched medially behind, 5 and 6 notched medially anteriorly, yellow on segment 6 extending onto the lateral spines; abdomen more or less ferruginous behind; punctuation of abdomen fine but not confluent, of thorax and head very close, especially so on dorsum of thorax; claws slightly cleft; 2d joint of labial palpi longest; basal nervure of wings received far before the transverse nervure which is curved outwardly.

Redescribed from one male specimen in Provancher collection marked 1728 and 209 and one male in collection U. S. National Museum, marked 209 Coquillett. These two specimens were collected by Mr. D. W. Coquillett in August in Los Angeles Co., Cal.

Anthidium angelarum n. sp. ♀.

Length 9.5 mm. Black with deep yellow markings on the following parts: clypeus except two black spots near upper margin, and the anterior margin, triangular side pieces extending a little above the base of the antennæ, interrupted line on occiput the inner points reaching to the outer ocelli on each side, mandibles except black tips and margins, large anterior and small posterior spot on tegulæ, elongate spot below tegulæ, anterior mesothorax with a line on each margin extending back along sides almost to tegulæ, scutellum with 4 spots, front femora with short stripe behind near apex, tips of all the femora with a long narrow stripe outwardly, bands on abdominal segments 1-5, large spots on segment 6, bands on 1-4 interrupted medially, also interrupted on sides on segment one, incised antero-laterally on segments 1-4, most deeply on 2; pubescence very sparse and white, tarsi densely pubescent with brownish hairs and silvery hairs which are darker towards tips, ventral scopa very white; claws cleft; basal nervure entering far before transverse, second recurrent entering second cubital at or closely behind the end.

Described from 5 females collected in Los Angeles Co., Cal., in April by Mr. D. W. Coquillett, from one female marked S. Cal. on yellow label, and from one female in the Provancher collection labelled *Anthidium montivagum*, No. 1730. Type No. 9034 U. S. National Museum.

Dianthidium provancheri, n. sp. ♂.

Length 6.5 mm. Black, small closely allied to *ulkei*, *ehrhorni* and *simile*. Yellow on clypeus, supraclypeal triangle, sides of face almost to summit of eyes, upper portion much narrowed, line on outer orbits extending one-third of way from eye to summit downward, mandibles except margins and tips, elongate spot on each side of anterior margin of mesothorax near scale, scale large, thin with a central spot, spot on outer edge of tegulae, elongate narrow line on each side of scutellum separated posteriorly by the emargination of the scutellum, bands on all abdominal segments except sixth and seventh, first segment with line in middle and irregular spots laterally, segments 2-5 with bands interrupted medially and strongly incised behind, segment 7 black at base, narrowly yellow beyond, strongly trilobed, the tip of the pointed central tooth darkened, outer lobes rounded outside but sharply straight inside, margins transparent, central lobe of tooth longest; anterior femora above and below, tibiae above with reddish yellow stripes, middle and hind femora brownish red beneath, yellow at apex, tibiae yellow above, dark beneath, hind tibiae outwardly yellow at base and apex (in some specimens the black portion is nearly obliterated), tarsi reddish brown, first joint with a yellow stripe above, coxae dark except for short stripes anteriorly which pass onto the large yellow spines; clypeus reddish-brown along margin; punctuation very dense and regular; claws slightly bifid; wings dark, basal nervure commencing before transverse nervure, 2d recurrent nervure not ending quite so far beyond apex of second submarginal cell as first recurrent nervure does beyond the apex of first submarginal cell; pubescence sparse white and yellow, dark yellow hairs lying flat at sides of postscutellum and projecting inward giving the appearance of a color line, group of yellow hairs behind base of wings, hair on face yellow and on thorax above yellow on pleura and beneath thorax white, pale on legs, white and very sparse on dorsum of abdomen, rather plentiful along abdominal edges and on last ventral segment; middle and hind spurs deep red, front spurs pale.

Described from one specimen in the U. S. National Museum, type No. 9033, and one in the Provancher collection, this latter numbered 1667 and 327; both specimens are from Los Angeles Co., Cal., collected by Mr. D. W. Coquillett. The Provancher specimen was labelled *Anthidium simile*.

There is a female in the Provancher collection labelled *Anthidium palliventre*, which I believe to be a new species. It is however, very closely related to several other species from

that region. It is numbered 1535 and was collected in Los Angeles Co., Cal., by Mr. Coquillett. A specimen evidently belonging to this same species is in the U. S. National Museum from the same locality, but has lost its abdomen.

I have not seen the *Cælixys* (*C. rufitarsis*, *C. mæsta* and *C. tristis*) recorded by the Abbé Provancher.

NEW SPECIES OF SPHENOPHORUS WITH NOTES ON
DESCRIBED FORMS.

BY F. H. CHITTENDEN, SC. D.

In three earlier papers on this genus, published in the Proceedings of our Society,¹ the writer has treated as many groups. There remain to be reviewed several more or less perfectly defined groups and a number of isolated species and other forms which do not possess easily discernible characters indicative of their position in a natural arrangement of the entire series. In the present paper the simplest forms, based on the structure of the tarsal joints, will be considered first, and those forms in which the third joint of the anterior and sometimes median tarsi are widest will be discussed later. Some questions of nomenclature will be taken up, as economic workers frequently inquire in regard to these matters, and it is preferable to have these questions considered in a technical paper.

Sphenophorus marinus, new species.

Of similar form to *inæqualis*; smaller and less robust; surface opaque black, with antennæ, tarsi, and lateral margin of the elytra piceous.

Rostrum two-thirds as long as thorax, stout, moderately arcuate, strongly punctate in basal three-fourths, especially coarse at the base, and finely sparsely punctate at apex, which is very slightly dilated but compressed and prolonged posteriorly into an acute point, strongly dilated over scrobes but scarcely more compressed than at apex. Head strongly but somewhat sparsely punctate. Eyes with a fine reflexed posterior margin, separated from the head by a strongly impressed wide extra-orbital line.

Thorax longer than wide by about the shortest diameter of the apical constriction; posterior two-thirds with sides nearly parallel; base strongly arcuate. Surface very coarsely, moderately, deeply and very densely to confluent punctate, leaving a distinct but irregular elevated median line, not quite attaining either apex or base and occasionally slightly interrupted; a few punctures coalescing near sides posteriorly, forming

¹ See Volume XII, p. 50, 1905.

a shallow fossa each side. Scutellum large subtriangular, concave at base, rounded at apex, nearly one-half longer than wide.

Elytra moderately acuminate; striæ moderately fine, deep, especially at base, with punctures much wider basally and not wider at apex. Intervals flat, subequal except third which is a little the widest, punctures large and placed at very irregular intervals except on first where they are smaller and twice as closely placed. Humeral and subapical callosities of moderate size, shining black and finely punctate, the latter prominent. Pygidium coarsely and deeply punctate.

Lower surface strongly and coarsely punctate, sparsely on metathorax and first abdominal segment. Legs finely punctate; tibiæ weakly sinuate on inner border, finely fimbriate, obliquely truncate at apices.

♂.—Pygidium wide and subtruncate at apex, with fringe of yellow hairs nearly uniform; ventral concavity distinct, shallow.

♀.—Pygidium narrow and rounded at apex, with hair normally in tufts at sides; first and second abdominal segments connate at middle, where the punctures are very sparse.

Length 4.8–6.0 mm.; width 1.9–2.4 mm.

Sea Isle City, N. J., June 10; Westville, N. J., collected by Mr. Charles R. Boerner, to whom we are indebted for this well-marked and interesting species. It is evidently maritime and probably very local.

Type.—No. 9449, U. S. National Museum. Cotypes in Mr. Boerner's collection.

This species is the smallest *Sphenophorus* occurring in the United States. The tarsal and tibial structure is similar to *parvulus* and *minimus*, which also have the same extraorbital grooves. The coarse subconfluent thoracic sculpture alone is quite sufficient for the separation of this species. The elevated median line of the thorax, the large concave scutellum, and prominent subapical callosities are also important characters.

The three species which have been mentioned are related to the *venatus* group. They may be classified as follows:

Thorax and elytra of about equal width.

Surface with fine cinereous coating of argillaceous material; thorax densely, regularly reticulately punctate, median line absent or very thin. N. Y.—Ill., Fla.—Tex..... *parvulus* Gyll.

Surface with velvety brown coating; thorax sparsely, irregularly and coarsely punctate, median line absent or short. W. Pa.—Ill., Fla.—

Tex..... *minimus* Hart

Thorax distinctly narrower than the elytra.

Black without coating; thorax densely to confluent and very irregularly deeply punctate, median line long and broad. N. J. (coast),
marinus n. sp.

Sphenophorus graminis, new species.

Black, moderately shining without coating, of robust appearance due to the elytra being much wider than the thorax.

Rostrum less than two-thirds as long as the thorax, robust, moderately arcuate, much compressed, most strongly at the apex; base moderately wide, suddenly and strongly dilated over the scrobes with dilated portion angular, very feebly or scarcely conalicate; interocular fossa round, shallow, sometimes indistinct; impressed line more or less indistinct, scarcely longer than the width of the rostrum over the scrobes; apex with a shallow concave triangular space on anterior face, subacutely rectangular on posterior face; surface finely moderately and densely punctate, gradually coarser in basal half. Head feebly, very sparsely punctulate.

Thorax (without apical constriction) nearly as wide as long, apical half arcuate, apical constriction strong; base distinctly bisinuate; surface somewhat densely and finely punctate, punctures nearly uniform except along the median line where there is a small narrow smooth space of varying extent (sometimes nearly absent) and at the middle of the basal margin where they are a little coarser and denser. Scutellum feebly concave or nearly flat.

Elytra about one-third wider than thorax and scarcely one-fourth longer than wide, moderately narrowed at apex; striae finely uniformly punctate, punctures not visible on the surface, sutural stria strongly curved outwardly at base; intervals flat, alternate in width, narrower ones finely uniseriately punctate, wider ones with two or three rows of similar punctures, antepenultimate interval depressed more or less strongly. Pygidium finely moderately densely punctate, each puncture with a short pale yellowish gray seta, apical tufts wholly wanting or exceedingly minute.

Lower surface finely, nearly uniformly punctate, punctures shallow and more dense than on thorax. Legs more sparsely and finely punctate than on thorax; tibiae feebly sinuate on inner surface and sparsely fimbriate; anterior tibiae with outer angle considerably prolonged. Anterior tarsi with third joint less than one-third wider than first.

♂.—Ventral concavity broad and shallow.

♀.—First and second abdominal segments connate or subconnate at middle. Pygidium comparatively broad.

Length 7-9 mm., width 2.8-3.8 mm.

The Dalles, Oregon, June 18, 19 (Hubbard and Schwarz); Laramie, Wyo. (Soltau); Salt Lake, June 25 (Hubbard and Schwarz), Salt Lake City, Utah, April 19 (Soltau); Cal. (coll. Ulke); Idaho (coll. Fall).

Observed by Messrs. Hubbard and Schwarz inhabiting the roots of a grass growing on dry sand hills at The Dalles, Oregon, sometimes a foot or so under ground.

Type.—No. 8966, U. S. National Museum.

The Wyoming and Utah specimens agree in having the abdomen proportionately narrower and the median smooth thoracic line and the apical tufts of the pygidium more distinct. This species is very generally labeled "*vomerinus*" to which it is related.

***Sphenophorus subopacus*, new species.**

Of nearly the same form as *vomerinus*, still duller black, punctuation finer and deeper and nearly uniform throughout. Rostrum less than half as long as thorax, narrow. Thorax very nearly uniformly punctate except near base, where it is more densely subrugosely punctate; smooth space very small, extending posteriorly from a point just in front of the middle. Scutellum not deeply sulcate. Elytra at base strongly sinuate and finely marginate, disk somewhat unequal; striae very narrow, punctures indistinct, first and third striae approximating at base; intervals flat, punctuation practically uniform, punctures same size as those of striae; intervals 1, 3 and 5 wider than 4 and 6, 1 with four rows of punctures at base, 3 beyond, 3 and 5 with three rows of fine punctures, 2 and 4 with from one to three rows. The second and third intervals from the margin are strongly depressed as in *graminis*. Anterior tibiae less dilated and not so prolonged laterally. In other respects there is so nearly an agreement of the type with *vomerinus* that a more elaborate definition is unnecessary, especially so in the absence of better material.

Length 9.5 mm., width 3.8 mm.

California (Ulke) two females.

Type.—In the Carnegie Museum at Pittsburg, Pa., co-type No. 8967, U. S. National Museum.

***Sphenophorus monterensis*, new species.**

Of very similar appearance to *graminis*, with the same shaped rostrum. Black, shining on ventral surface, opaque on dorsal.

Rostrum half as long as thorax, with distinct rounded interocular fossa and feebly indicated, wide, shallow sulcus; otherwise as in *graminis*.

Thorax two-thirds as wide as long, basal two-thirds subparallel, basal margin slightly bisinuate, apical constriction strong, surface somewhat densely and nearly uniformly finely punctate; a distinct smooth unpunctate median line about as long as the width of the thorax and with extremities as near the apex as the base. Scutellum feebly concave.

Elytra about one-fourth wider than thorax; striae fine, somewhat feebly punctate, sutural stria moderately curved at base; intervals (except third, which is slightly elevated near base) flat, alternate in width, narrow ones irregularly uniseriately punctate, wider ones irregularly triseriately. Pygidium finely densely punctate, with pale yellowish apical tufts.

Lower surface finely sparsely punctate, more coarsely and sparsely on metasternum and last ventral segment. Legs polished, finely and sparsely

punctate; tibiae feebly sinuate on inner surface, moderately fimbriate, anterior tibiae with outer angle acutely or moderately produced; anterior tarsi with third joint widely dilated, more than one-third wider than first joint.

♂.—Ventral concavity moderately deep, especially deep in metasternum. Pygidium scarcely subtruncate, sides broadly rounded.

♀.—First and second ventral segments with fine dividing line. Pygidium with concave area each side with strong median dividing line.

Length 8.5 mm., width 3.2 mm.

California: Monterey Co. (Koebele); San Diego Co. (Coquillett); "Cal." (Riley and Ulke); Long Beach, June 15 (Fall); Fresno, May 25 (Schwarz).

Type.—No. 8969, U. S. National Museum.

The very close resemblance of this species to *graminis* is remarkable, considering the difference in the tarsal structure. There is a tendency toward a second row of punctures on the narrower elytral intervals and the outer angle of the anterior tibiae is of variable length. In one individual the legs are dark rufous. There is considerable variation also in the width of the third joint of the anterior tarsi, but these and other variations from the type are perhaps individual, although the presence of a larger series with definite localities may show that there are two species included under this name.

As to habits, the only available data are that it was collected by Mr. Schwarz associated with *S. ochreus* in wet ground on the banks of irrigating ditches, on the roots of a rush of unknown species.

Sphenophorus diversus, new species.

Slender, black, with antennae, portions of legs, apex of abdomen at sides, and margins of elytra, piceous.

Rostrum less than half as long as thorax, moderately arcuate and compressed, more strongly at apex than at base; apex flat on anterior face, rectangular on posterior aspect; at base fully twice as wide as at middle, strongly dilated above scrobes with acute angles; interocular fossa round and deep; scarcely canaliculate, and with impressed line faint, very short, about twice as long as the diameter of the interocular fossa. Surface coarsely but sparsely punctate, gradually becoming finer to the apex.

Thorax fully one-third as long as wide; apical constriction moderate; sides moderately arcuate. Vittae somewhat distinctly indicated by smoother, more finely and sparsely punctate areas, elevated in their posterior half; median extending from base to apical constriction, narrowed at each end to about half the width of the scutellum, widely and somewhat suddenly dilated at a point behind the middle, and becoming confluent with the lateral vittae just in front of the middle. Interspaces

in the form of two rows of six or more punctures gradually increasing in size to apical constriction, in posterior half with large, irregularly placed, and confluent, foveate punctures. In the posterior third there is also on each side a rather large oval slightly depressed area, with contiguous shallow punctures considerably smaller than those in the interspaces and much larger than the punctures of the sides, which are fine but distinct and sparse. Scutellum flat, shining, moderately declivous to base.

Elytra one-fifth wider than thorax, somewhat strongly narrowed to apex, where the surface is a little uneven. Striæ moderately fine and deep, finely and closely punctate (16-20 punctures on longest striæ); punctures short, oval on disc, round and shallow at sides. Intervals nearly equal in width and convexity; 1, 3, 5, and 9 partially biserially and very finely punctulate, others uniserially and scarcely less finely but less closely punctulate, 3 distinctly elevated in anterior half, 5 less distinctly; 8 and 9 considerably depressed and coated; humeral callosities small but well defined, subapical ones subtubercular. Pygidium very strongly, coarsely and densely punctate.

Lower surface strongly, coarsely, and moderately sparsely punctate, punctures not remarkably coarser on the sides. Legs a little less strongly punctate than middle of abdomen. Tibiæ sinuate, and finely fimbriate on inner surface, subapical spurs minute. Anterior tibiæ with inner spur acute and long, placed nearly at a right angle, outer angle slightly produced; middle tibiæ a little rounded at apex, posterior tibiæ obliquely truncate. Third joint tarsi: anterior one-fourth, middle one-fifth, posterior one-fifth+, wider than first joint.

♂.—Pygidium wider than long, broader and more broadly rounded at sides of apex, lateral tufts minute. Ventral surface much more uniformly punctate than in ♀, first and second abdominal segments weakly concave, third and fourth distinctly but sparsely punctate, last segment densely punctate and without finely punctate basal area.

♀.—Pygidium a little longer than wide, moderately narrowed and rounded at apex, strongly divided by a median carina, each side of which there is a large deep fossa; vestiture not visible, except at apex, where there are two minute tufts each side. Metasternum nearly flat, strongly divided at base, very sparsely but not coarsely punctate; first and second abdominal segments strongly convex, second and third with same punctuation except in posterior third or half, where the surface is impunctate. Last segment strongly and coarsely punctate except at apex and a small median area near base, which are finely and densely punctate. Femora glabrous.

Length 8.5 mm. (♀)—6.0 mm. (♂); width 3.9 mm. (♀)—2.5 mm. (♂).

California (1 ♀, coll. Ulke); Pullman, Wash. (1 ♂, coll. Fall).

Type.—In Carnegie Museum at Pittsburg, Pa.; cotype, No. 8968, U. S. National Museum, a donation from Mr. H. C. Fall.

In its thoracic sculpture this species bears some likeness

to *ulkei*, but the punctuation of the elytral striæ, as well as that of the intervals, is without a parallel in our representatives of the genus; in short, the species does not display any great affinity to any others known to the writer.

***Sphenophorus nevadensis*, new species.**

Form similar to *vomerinus*, more depressed, shining black.

Rostrum two-thirds as long as thorax, interccular fossa distinct, elongate-oval, with fine impressed line reaching to dilated portion above scrobes. Thorax as long or nearly as long as wide, sides nearly evenly strongly arcuate, a little more strongly anteriorly. Elytra one-fifth wider than thorax and fully one-fourth longer than wide. Striæ deep with much stronger punctures than in *vomerinus* group, visible on surface, less obvious apically, and stronger to the sides, somewhat distantly placed; penultimate and antepenultimate striæ indicated by large deep punctures, middle of sixth stria usually similar; intervals 1, 3, and 5 slightly concave or flat, closely and finely punctulate, either in one or two rows, the others less closely uniseriately punctulate except antepenultimate (9) which is biseriate. Pygidium densely punctate, coarsely except at apex where it is much finer, vestiture wanting or very sparse. Lower surface punctuated more finely than on thorax. Legs nearly as coarsely, but more sparsely punctate than on thorax. Anterior tibiæ obliquely truncate at apex. Third joint tarsi: anterior $\frac{1}{2}$, middle and posterior $\frac{1}{4}$, wider than first.

Length 8.5–9 mm., width 3.2–3.8 mm. A small individual measures 7 mm.

♂.—As in *graminis*, with which the species agrees very closely in characters which to save repetition have not been mentioned.

♀.—Pygidium narrow, acuminate to apex where it is narrowly rounded.

California (Roberts); Nevada (Ulke).

Type.—No. 8975, U. S. National Museum. Cotypes in Carnegie Museum at Pittsburg, Pa.

In the punctuation of the elytral striæ this species is unique, resembling somewhat *retusus* and *subulatus* in both of which, however, the intervals are convex.

***Sphenophorus fallii*, new species.**

Of similar form to *arizonensis*, more shining; elytra rufopiceous. Rostrum shorter, more suddenly compressed at apical fourth; interccular puncture elongate, terminating in a strongly impressed line extending beyond the scrobes. Thorax more finely punctate. Elytral striæ interrupted by less rounded more or less subcordate punctures more closely set, about 18 to each stria. Lower surface with last segment coarsely and deeply punctate. Anterior tibiæ truncate; subapical spurs feebly developed. Anterior and middle femora fimbriate in middle half. An-

terior tarsi with third joint transverse cordate, twice as wide as first spongy pubescent on under surface.

♂.—Ventral concavity moderately deep. Pygidium with feeble median, dividing line; apical tufts minute.

Length 8.3 mm., width 3.2 mm.

Santa Fé, New Mexico, August, 1887 (coll. H. C. Fall).

Type.—No. 9726, U. S. National Museum, 1 ♂.

This form might readily pass as the male of *arizonensis*, of which I have seen only the female, but for the spongy pubescent lower surface of the third joint of the anterior tarsi which throws the species into a distinct group. The characters furnished in the description indicate the main differences. Otherwise the two are remarkably alike.

Sphenophorus subulatus, new species.

Form slender, resembling *simplex*; general color polished black; antennae piceous, and portions of legs more or less indistinctly piceous, dorsal surface sometimes piceous.

Rostrum three-fifths to four-fifths as long as thorax, somewhat feebly and uniformly arcuate, cylindrical, a little more compressed at base and narrowed at apex; apical fifth to third laterally subcarinate. Base somewhat feebly dilated, little more over scrobes, not canaliculate; interocular fossa inconspicuous, rounded; impressed line wanting or feebly indicated each side of scrobes, not extending to the fossa. Apex flat or slightly convex on anterior face.

Thorax about one-fourth longer than wide, nearly uniformly arcuate at sides to apical fourth, where it suddenly narrows to apex, the latter strongly constricted; surface more coarsely, sparsely, and deeply punctate than in *simplex*, with median smooth line half as long as thorax, extending from in front of middle and not attaining base; each side of median line the punctures are deeper and confluent. Basal margin nearly straight. Scutellum flat or channeled at middle.

Elytra one-fourth wider than thorax, one-half longer than wide, somewhat strongly narrowed to apex. Striae half to nearly as wide as narrow intervals, coarsely and closely punctate, punctures encroaching on intervals gradually more strongly from sutural to lateral, where the striae tend toward obsolescence. Intervals all convex, subequal except third, which is widest, alternately uniseriately and biseriately punctulate, 5¹ and 7 sometimes uniseriately. Pygidium coarsely and densely punctate, punctures becoming confluent at apex and at sides, glabrous except apical tufts at sides.

Lower surface coarsely and densely punctate, punctures deep, not varying conspicuously in size, except in the customary extreme places,

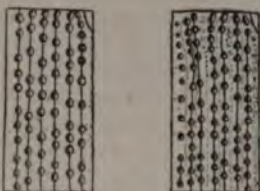


FIG. 11.—Sections of elytra, showing striae punctation: *Sphenophorus arizonensis* at left, *fallii* at right.

those of sides being considerably larger than the middle on the third and fourth ventral segments. Legs strongly and somewhat finely punctate. Tibiæ densely fimbriate with short hairs. Third joint tarsi: anterior one-fourth, middle and posterior one-fifth, wider than first.

♂.—Ventral concavity somewhat faint, last ventral segment with large deep rounded fossa. Pygidium comparatively wide at apex, with sides somewhat broadly rounded.

♀.—Metasternum flat or nearly so, abdominal segments convex, the last narrowly transversely concave at the apex. Pygidium narrower at the apex and more broadly rounded than in ♂.

Length 8-9 mm., width 3.9 mm

New Mexico, 2 ♂♂, 1 ♀ (coll. Ulke). One male of this small series is much more finely punctate over the entire surface than the other two, otherwise it does not differ.

Type.—In the Carnegie Museum, Pittsburg, Pa. Cotype, No. 8970, U. S. National Museum (♂) through the courtesy of Dr. W. J. Holland.

This species is very different from any other *Sphenophorus* occurring in the United States, but three closely related forms in the National collection, from Mexico, display great similarity, evidence that the type may be a common one in Central America and that there may be many more species of this group in that region. The rostrum is more slender than in others of our fauna, while the anterior tibiæ are less dilated at the sides than in the *simplex* and *vomerinus* groups, and are very slightly angulate.

Sphenophorus destructor, new species.

Of similar form to *zeæ*, proportions variable, but with an average width of four-tenths the length. Surface usually so thickly coated with dull clay-colored or pale brown argillaceous deposit that the punctuation, more especially of the elytra, is much obscured.

Rostrum three-fourths as long as thorax, moderately arcuate, nearly straight on middle half of anterior margin, feebly compressed in the middle third, thence widening gradually to the apex, which is subobtusely angled behind. It is slightly protuberant above the eyes, considerably dilated in front of the scrobes, and somewhat deeply and broadly channeled from the base to a little beyond the scrobes, this channel frequently filled with argillaceous deposit; surface rather deeply and densely punctate, at base coarsely. Head moderately finely and sparsely punctate.

Thorax a little longer than wide, posterior half with sides nearly parallel, anterior half strongly arcuate, moderately constricted at apex, strongly bisinuate at base; surface irregularly trivittate; vittæ variable, tending toward obliteration in some individuals, middle vitta irregular elongate fusiform, with an irregular, interrupted, shining, black, elevated line

extending from apex to near base, sometimes only half as long, rarely but slightly indicated; lateral vittæ sinuate, narrower than median, their most elevated portion showing in a very irregular much interrupted shining black line; surface of vittæ very coarsely, irregularly, rather sparsely, punctate, intervals still more coarsely sparsely punctate; a large shallow fossa each side of the apical half of the thorax and a similar deeper fossa each side of the base. There is usually an indistinct branch of the lateral vittæ. Scutellum opaque or subopaque, channeled.

Elytral surface comparatively even, with obscure punctuation. Striæ moderately, deeply, coarsely and remotely punctate, about 12 punctures on the sutural and next three striæ, so closely placed as to form at the base four small shallow fossæ between alternate intervals; intervals very irregular owing to the large elytral punctures, alternately very slightly elevated, elevated intervals closely uniseriately punctulate, the others half as closely punctulate, the third with a tendency to produce 2 rows of fine punctures. Pygidium rather coarsely, deeply and sparsely punctate, with short golden yellow hairs and short lateral apical tufts.

Lower surface very coarsely, sparsely punctate, at the sides scarcely different from the middle and the lower surface of the thorax; second, third and fourth ventral more finely, apex of last segment densely and coarsely punctate. Anterior tibiæ with inner apical tooth moderately long, subapical less than half as long and obtuse. Third joint of tarsi: anterior and middle about one-fourth or one-fifth wider than the first joint, of posterior tarsi scarcely wider.

♂.—Pygidium subquadrate. Ventral concavity broad and very shallow.

♀.—Pygidium distinctly narrowed to rounded apex. Metasternum, first and second abdominal segments flat, the last two connate or nearly so.

Length 7.0-9.5 mm., width 3.2-4.0 mm.

Atoka, Mo., June 7, (W. J. Moss); Texas (Belfrage, Riley); Georgia City, Mo. (C. B. Guinn); Stillwater, Okla. (A. N. Caudell); Medora, Kans., May 22 (Knaus); Anglesea, N. J., June 15 (C. Boerner).

Type.—No. 8971, U. S. National Museum.

At first sight this species might be taken for an aberrant form of *zeæ*, and this applies particularly to large individuals, but it is more nearly related to *callosus*, and occupies a position about midway between these two as regards the thoracic pattern. A somewhat striking character is the distinctness of the four thoracic and six basal elytral fossæ in clean well-marked individuals and the coarsely punctate elevated lines of the vittæ. The smallest individuals seen, *e. g.*, the eastern ones, are less strongly marked than the typical Texas and Kansas examples, approaching *callosus* in the sculpture of the thorax but differing by being proportionately stouter.

This species has been reported as quite injurious to corn

in portions of Missouri from 1884 to 1903, and to chufa (*Cyperus esculentus*) in Oklahoma.

***Sphenophorus sublævis*, new species.**

Very similar to the above but distinguishable by its uniform dull black color due to the absence of argillaceous coating and by having much deeper, coarsely foveate punctures on the entire dorsal surface. The rostrum is more protuberant in front of the eyes, more strongly compressed, and the apex is acutely or subacutely angled posteriorly. The elevated portions of the thoracic vittæ are much wider, without elevated lines. The four fossæ are scarcely indicated. The elytral surface is much more irregular and the very deep and large stria punctures and more minute punctures of the intervals are conspicuous. The apical tibial spurs are very long as are the subapical spurs, the latter being nearly as thick and half as long in the anterior pair. Pygidium with much paler, scarcely yellow hairs. Sexual characters about as in *destructor*.

Length 9-10 mm., width 3.5-4.2 mm.

Indiana and Wisconsin (Wickham); St. Louis, Mo., July 10, 1873 (C. V. Riley); Champaign, Ill., April 23; Cook Co. Ills. (Hart).

Type.—No. 8972, U. S. National Museum.

***Sphenophorus callosus* Olivier. (Fig. 20).**

Calandra callosa Olivier, Hist. Nat. des Ins., Vol. V., p. 92, Pl. XXVIII fig. 416, 1807.

Sphenophorus sculptilis Horn (*nec* Uhler) Proc. Am. Phil. Soc. p. 424 1873.



FIG. 20.—*Sphenophorus callosus*.

This species was united by Le Conte¹ and Horn with *cariosus* Ol., but wrongly so, as I shall attempt to prove. Olivier's description reads in substance as follows:

Body black with dark cinereous coating. Antennæ brownish black, shining, cinereous at apex. Rostrum black, dark cinereous at base. Thorax uneven, "and one sees on the superior portion an elevation in the form of a cross, feebly marked." Elytra uneven, feebly varicose, marked toward the apex with a callous point, nearly spinose, blackish, shining.

Olivier's illustration is imperfect in that it is very crude, showing neither punctuation nor sculpture and the general impres-

¹ Rhynch. N. A., p. 425.

sion is that of a shining species, which was certainly not intended. The thorax is a little short, otherwise the form coincides with the species which is figured herewith.

The cinereous base of the rostrum is an important character, as it signifies that a considerable portion of the base is coated while in *cariosus* it is not. The cross-like elevation of the thoracic disc is aptly described as *feebly* indicated, in fact is requires a little imagination to discern it in many individuals; moreover, it is not shown in Olivier's figure. In the true *cariosus* the cross is black, shining and well-marked, and the cariniform base of the third elytral interval which is always present is so prominent as to attract the attention of the veriest tyro.

The type locality "Carolina" will answer for either species. North Carolina appears to be the metropolis of *callosus*.

Sphenophorus cariosus Olivier.

Sphenophorus sculptilis Uhler, Proc. Acad. Nat. Sci. Phila., 1855, p. 416

As the original description of *sculptilis* may not be accessible to many, it is transcribed below together with italicized words of my own and brackets to indicate portions of the description which are not specific.

Entirely black, elevated portions shining; thorax with a sphenoid, posteriorly acuminate, medial, and two undulating, prominent elevations. 8½ lines long to tip of rostrum. Baltimore.

Black punctured; rostrum, rather robust, *finely punctured at base sulcated* [and dilated immediately in front of base; club of antennæ, whitish at tip; thorax round, constricted in front, and slightly dilated a little before the middle], densely and coarsely punctured at sides, and between the elevations, puncta becoming finer anteriorly; scutellum deltoid, excavated; elytra with *two elevated*, interstitial lines, a *prominent* elongated tubercle each side behind the humerus, and a *round* one near the apex of each elytron, sutural lines slightly elevated; [the three medial, and subsutural ones a little punctured at base; pygidium somewhat coarsely punctulate, punctures becoming finer at base; legs finely punctulate, patella more coarsely so; a large deep fovea upon the base of the postpectus, posteriorly; venter with gradually enlarging punctures, increasing in size toward the base].

After carefully comparing several species with this description I have come to the conclusion, in the absence of a knowledge of the whereabouts of Uhler's type, which cannot be located and may be destroyed, that it was based upon a somewhat unusually large specimen of *S. cariosus*, which measure somewhat less than "8½ lines" including the rostrum. Horn, in his

synopsis, recognized *zeæ* Walsh as distinct from *sculptilis* Uhl., but while the former is correctly described, showing that he had the Walsh species, he states of the second; "Body above entirely covered with dense argillaceous coating, ochraceous or pale brownish in color," which is never true of *zeæ* in any specimens which I have seen. Nevertheless LeConte¹ united these two species, sinking *zeæ* as a synonym of *sculptilis*, at the same time that the name *callosus* was suppressed in favor of *cariosus*.

To place Uhler's description in shorter words, it means a species about three-fourths of an inch in length, including rostrum, which is sulcated and finely punctured at base, "with two elevated, interstitial lines, a prominent elongated tubercle each side behind the humerus, and around one near the apex of each elytron." The rostrum of *zeæ* is neither sulcated nor finely punctate at base. Moreover, no species which I have seen other than *cariosus* would be apt to be described in the terms of the first three lines of Uhler's description and at the same time agree to the characterization of the elytra.

The *Calandra callosa* of Olivier, according to the writer's interpretation, is entirely distinct from *cariosus*, as will be seen by reference to figure 20.

Sphenophorus *zeæ* Walsh.

The name of this species, which was described in "The Practical Entomologist,"² and in the 3d Report of the State Entomologist of Missouri,³ may now be restored to technical entomology, as it has never been quite dropped out of economic writings. The description, and above all the figure, undoubtedly from Walsh's type or cotype, is unmistakable.

Sphenophorus soltauui, new species.

Body subfusiform, half as wide as long; subopaque black, elevated portions somewhat feebly shining, no trace of alutaceous coating.

Head deeply and rather densely punctate above the eyes, less distinctly and more sparsely on the vertex. Rostrum three-fifths as long as the thorax, irregularly feebly arcuate, considerably compressed; proximal fourth produced in front of the eyes, basal fourth variolately punctate, marked by a very short and fine median line (channel and interocular fossa wanting), strongly dilated at the sides, angles rounded; middle half of rostrum nearly straight and parallel as viewed from the side, apical fourth more compressed with inner angle not produced, obtuse.

¹ Rhynch. N. A., 1876, p. 425. ² Vol. II, p. 117. ³ Page 59.

Thorax longer than wide, posterior three-fourths moderately arcuate-apical constriction very feebly, surface very coarsely, densely, unevenly punctate, punctures frequently confluent. The median vitta takes the form of an irregular smooth, unelevated space of varying length, and of a width about the same as an elytral interval; lateral vittæ absent. Scutellum sulcate with median line.

Elytral striæ irregularly, very deeply, coarsely, confluent punctate in the basal portion, becoming very narrow toward the apex. Intervals irregularly alternate in width and convexity, 1, 5, 7 uniseriately punctate except in the basal portion, third interval wider and distinctly biseriate in basal half; intervals 2, 4, 6 more coarsely and sparsely punctate. Pygidium subtriangular, as long as wide at base; apex subacute, hairs whitish gray, apical tufts minute but distinct.

Lower surface moderately coarsely and moderately sparsely punctate. Anterior and middle tibiæ with the outer angle somewhat feebly prolonged. Anterior and middle tarsi with third joint strongly, of the posterior feebly, dilated.

Length 7.5 mm., width 3.8 mm.

Greeley, Colo., April 22 (Soltau); Iowa City, Ia., May 21 (Wickham); Northern Illinois (coll. Roberts); Texas (coll. Ulke); Pittsburg, Pa., August (1 ex., H. G. Klages).

Type.—No. 8973, U. S. National Museum.

Sphenophorus blanchardi, new species.

Form moderately robust, resembling *scoparius* in size and proportions, general color subopaque black on dorsal, moderately shining on ventral, surface. Larger punctures filled with gray extraneous argillaceous material. Antennæ and tarsi slightly piceous, nearly black.

Rostrum two-thirds as long as thorax, moderately, nearly uniformly arcuate, except at base and apex, where it is perceptibly and about equally compressed. Base strongly dilated, fully twice as wide as at middle of rostrum, strongly and angulately dilated over scrobes; basal fossa large, deep and broad near head, usually ending in a distinct line beyond dilated portion of rostrum. Apex flattened on anterior face, usually concave, on posterior face more or less strongly and acutely produced. Surface strongly punctate, very coarsely at base and finely at apex.

Thorax about one-fourth longer than wide, moderately arcuate at sides; apex strongly constricted, with the extreme apical margin also strongly constricted on each side, the lower portion projecting beyond the upper. Surface very coarsely foveate-punctate, more finely on a slightly elevated area just in front of middle, and on two variable areas

(which resemble obsolete vittæ) on each side of basal half. The spaces separating these from the median area are most coarsely punctate. Basal margin strongly bisinuate. Scutellum broadly but not deeply channeled at middle.

Elytra one-fifth wider than thorax, one-third longer than wide, moderately narrowed toward apex. Striæ fine, very coarsely and sparsely punctate, with punctures nearly as wide as the intervals, which they distort. Intervals all convex except at base, strongly punctate; larger punctures foveate; 1 finely, closely, and irregularly biserially punctate (sometimes uniserially); 3 with two or three series of punctures in basal third or less and uniserial in remainder; 5 and 7 narrower than 3, but similarly punctate; 2, 4 and 6 sparsely foveate-punctate, punctures more than one-third larger than on 1, 3 and 5; remaining intervals except at base very irregular and obscured by coating. Pygidium much exerted, finely punctured in proximal portion; remainder coarsely, deeply, and irregularly punctate; golden yellow hairs forming tufts each side.

Lower surface finely and sparsely punctate, varying as usual in the genus; legs strongly but much more finely punctate, tibiæ distinctly sinuate and somewhat densely fimbriate, with short black hairs. Third joint of tarsi: anterior and middle one-third, posterior one-fifth, wide than first joint.

♂.—Ventral concavity moderate, punctuation variable, disposed to be coarser than in female. Pygidium truncate at apex, with sides rounded.

♀.—First ventral segment strongly convex, the last with distinct fossa. Pygidium much narrowed at apex.

Length 10.5–12.5 mm., width 3.9–4.8 mm.

Texas. Described from 3 ♂♂ and 1 ♀.

Type.—No. 8974, U. S. National Museum (♂). Cotypes in the collection of Mr. Frederick Blanchard, who has kindly divided his material with our National Museum.

This species does not suggest any other in our fauna which has come to my notice. The projecting lower portion of the apical face of the thoracic constriction or collar is apparently peculiar to this species.

Sphenophorus striatipennis, new species.

Form of *costipennis*. General color red variegated with black, head and rostrum, median thoracic vitta, sutural intervals, abdominal segments, metepisternum, coxæ, knees, and tarsi black; somewhat weakly shining above, more polished on lower surface. Thoracic interspaces and elytral intervals with bright but light colored alutaceous coating. Rostrum less arcuate, not suddenly recurved and compressed in apical fourth; apex deeply concave on anterior face. Thorax less sinuate at base, median lobe more feebly prolonged; branch of lateral vitta less prominent. Elytral striæ fine and distinct, punctures small, distinct and

deep and closely set. Lower surface more strongly coarsely punctate, ventral segments, particularly 2, 3, and 4 more densely. Femora and especially tibiae more strongly fimbriate. Posterior tarsi same as middle, third joint strongly explanate, as wide as long, about twice as wide as first.

Length 9.5–12.5 mm., width 3.8–5.0 mm.

Chicago, Ill. (Chittenden); Indiana, Wisconsin, and Texas (U. S. N. M.); Marquette, Mich., July 14 (Hubbard and Schwarz); Spirit Lake, Ia., June (Wickham); Nevada and California (Ulke). Evidently somewhat rare.

Type.—No. 9727, U. S. National Museum.

The above description applies to the most distinct form of this species. There is, however, a color variation which does not seem deserving of a different name. It agrees with the typical form except in the fact that black is the predominating color; the vittae and intervals are all more or less shining black.

This species is quite closely related to *costipennis* but is distinct by the more fimbriate tibiae, wider third joint of the posterior tarsi, and stronger punctuation of the lower surface. The typical form is distinct by color alone, but the less strongly marked form is duplicated by a Michigan specimen of *costipennis* (1 in 300). This species as such was overlooked by Horn, as also by the writer, in considering species of the *pertinax* group. The former mentioned it, however, as a variety "with the upper surface red, with the sutural interval and the median vitta black. The under surface is red varied with black, and the legs also red with the knees black."

Sphenophorus æqualis Gyllenhal.

This common, well-known species is quite different from *ochreus* Lec., the former being an eastern, the latter a western form; in fact, the two species are quite as distinct by many characters, more particularly by the punctuation of the elytra and the coloration of the thoracic vittae, as are either from *discolor* Mann. The principal differences may be expressed in tabular form, as follows:

Body covered with thick coating, subopaque on dorsal surface.

Thoracic vittae *pale*, usually buff, distinctly elevated; median not wider at base than at apex; lateral with branch more or less indistinctly indicated; interspaces and sides distinctly *deeply* somewhat irregularly punctate. Scutellum coated, pale.

Elytral striae with moderate *rounded* and deep punctures.

Metasternum, first and second ventral segment ♂ concave and villous at middle; interior surfaces of femora and tibiae ♂ strongly

fimbriate. Anterior and posterior femora ♀ feebly fimbriate.

Atl. Sts.—S. Dak.,.....*aqualis* Gyll.

Body covered with thin, less dense coating, shining throughout.

Thoracic vittæ black, less elevated; median wider at base than at apex; lateral without distinct indication of branch; interspaces and sides with *shallow* nearly uniform punctures. Scutellum not coated, shining black.

Elytral striæ with smaller shallow, *oval* punctures.

Metasternum, first and second ventral ♂ naked or feebly villous; interior surface of anterior and posterior femora ♂ feebly fimbriate as in ♀ *aqualis*. Posterior femora ♀ glabrous. Utah Mex.....*ochreus* Lec.

NEW CULICIDÆ FROM THE WEST INDIES AND CENTRAL AMERICA.

BY D. W. COQUILLET.

The following new forms of mosquitoes were found among a very valuable collection made in the West Indies and Central America during the past summer by Messrs. August Busck and Frederick Knab, under the direction of Dr. L. O. Howard. Quite a large proportion of the species were bred from the larva state.

Tæniorhynchus flaveolus, new species.

Scales of proboscis yellow and with several black ones intermixed, those of the palpi mixed yellow and black, with a band of white ones at the sutures of the joints; palpi slightly widening at the apex; appressed scales of the occiput light yellow, the numerous upright ones brown. Body yellowish, scales of mesonotum and scutellum light yellow, the hairs black, scales of abdomen golden yellow, a few black ones on the first three and the last segment. Scales of legs mixed yellow and black, not forming distinct spots or bands, those on the apices of the joints of the middle and hind tarsi wholly black, on the broad bases of the last four joints white; claws of front and middle tarsi with a tooth under one of the claws, none under the other, hind tarsal claws simple. Wings hyaline, the scales oval, mixed black and yellow, not forming distinct spots. Length nearly 5 mm.

St. Thomas, W. I. A male specimen collected by Mr. A. Busck.

Type.—No. 8288, U. S. National Museum.

Mansonia fascipes, new species.

Distinguished by the coloring of the hind tarsi. Scales of palpi mixed

black and yellow, those on the apex white. Scales of proboscis mixed black and yellow and with several white ones beyond its middle, almost forming a band. Scales of occiput light yellow, those along the sides white, the upright ones chiefly brown. Thorax brown, its scales golden yellow. Abdomen purple-scaled, a patch of pale yellow ones near middle of sides of each segment; venter black-scaled, front angles of the segments whitish-scaled. Femora and tibiae black-scaled and with many patches of light yellow ones, the under side of the hind femora and inner side of their tibiae chiefly yellow-scaled; front and middle tarsi black-scaled, the first joint with many small patches of yellow ones, both ends of the first three joints and the whole of the last two, yellow-scaled; hind tarsi the same except that the third joint is wholly yellowish-scaled; tarsal claws simple. Wings hyaline, the scales black, yellow, and white, the latter collected into about seven spots, several narrow lateral scales on most of the veins. Length 5 mm.

Puntarenas, Costa Rica. Four females collected by Mr. F. Knab.

Type.—No. 8296, U. S. National Museum.

Gymnometopa, new genus.

Near *Stegomyia*, but the clypeus is wholly bare and the scutellum bears many narrow scales in addition to the broad ones. Scales of occiput broad, appressed and with several narrow, forked, nearly erect ones. Scales of legs appressed. Venation normal, the lateral scales of the veins rather narrow. Palpi of the male about as long as the proboscis, those of the female less than one-third as long.

Type: *Stegomyia mediovittata* Coq., from the West Indies.

The larva differs widely from that of *Stegomyia fasciata* in having many spreading tufts of rather long hairs scattered over the body, nearly as in the genus *Uranotenia*. *Stegomyia busckii* Coq. and *S. sexlineata* Theob. also belong to this new genus.

Gymnometopa albonotata, new species.

Like *busckii*, the only apparent differences being the presence of a silvery dot in middle of front margin of the mesonotum, and a distinct white band at base of first two joints of the front and middle tarsi and of each joint in the palpi of the male; the broad apices of the palpi of the female are white-scaled.

San Francisco Mts., Santo Domingo, West Indies. Five males and three females collected by Mr. A. Busck.

Type.—No. 8297, U. S. National Museum.

Dr. Dyar informs me that the larva is readily separable from that of *busckii*.

Culex knabi, new species.

Proboscis and palpi black-scaled; head, thorax and scutellum yellow,

their scales and hairs golden yellow, pleura with a few patches of white scales. Abdomen purple-scaled, front angles of the segments yellow-scaled; venter yellow-scaled and with an apical band of purple ones on the last four segments. Femora and tibiae purple-scaled, the basal half of the hind femora and the bases of the others, especially on the posterior side, yellow-scaled; bases of the first three tarsal joints white-scaled, covering nearly the whole of the first two joints on the middle and hind tarsi, scales on remaining portions of tarsi purple; all tarsal claws toothed. Wings hyaline, the scales brown. Length 5 mm.

Tehuantepec, State of Oaxaca, Mexico. Seven females collected by Mr. Frederick Knab, for whom this elegant species is named.

Type.—No. 8289, U. S. National Museum.

Culex bracteatus, new species.

Near *confirmatus*, but the patch of scales on median portion of anterior half of the mesonotum is golden brown, instead of whitish. Proboscis and palpi brown-scaled, occiput brassy-yellow-scaled and with a patch of brown ones on each side. Scales in middle of anterior two-thirds of the mesonotum golden brown, those along the sides and on posterior third of the mesonotum deep brown, the latter intermixed with brassy-yellow ones. Abdomen black-scaled, a narrow band of whitish ones at base of each segment, expanded into lateral spots on the last three segments, venter whitish-scaled, the black of the dorsum encroaching on the hind angles of the first five segments. Legs black-scaled, the bases and large portion of the underside whitish-scaled; claws of front and middle tarsi toothed, those of the hind ones simple. Scales of wings brown. Length 3.5 mm.

Habana, Cuba. Four females collected by Mr. J. R. Taylor.

Type.—No. 7753, U. S. National Museum.

Verrallina laternaria, new species.

Scales of proboscis black, palpi of male about as long as the proboscis, their hairs and scales black; occiput densely white-scaled and with a patch of black ones each side. Mesonotum densely covered with white scales, its bristles and those of the scutellum yellow. Abdomen black-scaled, a patch of white scales in the front angles of each segment, largest on the last three segments. Legs black-scaled, the apices of the middle femora and whole of the hind ones, except the base and a band before the apex, white-scaled; both ends of the first joint of the middle and hind tarsi, covering nearly the entire joint on the middle tarsi, and base of the second joint, white-scaled; claws of front and middle tarsi with one tooth under one of the claws, none under the other, claws of hind tarsi simple. Wing-scales brown. Length 3.5 mm.

Trinidad, West Indies. Five males collected by Mr. August Busck.

Type.—No. 8290, U. S. National Museum.

The genus *Verrallina* Theobald was founded on female specimens only and was referred by its author to the subfamily *Aëdeomyinæ*, but the present species clearly belongs to the *Culicinæ*.

***Tinolestes*, new genus.**

Near *Aedes*, but the lateral scales of the veins of the wings are much broader and the palpi in the male much longer. Hairs of antennæ of male long and abundant, in the female short and sparse. Palpi of male nearly twice as long as the head, almost one-half as long as the proboscis, those of the female about as long as the head, less than one-sixth as long as the proboscis. Appressed scales of occiput narrow, a patch of broad ones each side, numerous upright forked scales on the occiput. Scales of scutellum very narrow, metanotum bare. Lateral scales of veins of wings broadly oblanceolate, a few nearly linear ones on basal half of wings.

Type: The following species:

***Tinolestes latisquama*, new species.**

Scales brown, the appressed scales of the occiput, venter, front angles of abdominal segments, coxæ, and under side of the femora at their bases, yellow. Front and middle tarsal claws of male with one tooth under one of the claws, none under the other, claws of the hind tarsi and all claws in the female simple. Length 3 mm.

Port Limon, Costa Rica. Seven males and five females collected by Mr. F. Knab.

Type.—No. 8298, U. S. National Museum.

***Micraëdes*, new genus.**

Near *Aedes*, but the palpi much longer in both sexes. Palpi noticeably longer than the head, about one-third as long as the proboscis, apparently two-jointed, the apical joint slightly longer than the basal. Hairs of male antennæ much longer and more numerous than in the female. Clypeus bare. Occiput covered with narrow, curved scales and with many upright forked ones, the lateral portions covered with very broad, appressed scales. Scutellum bearing very narrow scales and six bristles on the median lobe. Scales of legs appressed. Venation normal, hind cross-vein over twice its length before the small, the lateral scales of the veins very narrow.

Type: The following species:

***Micraëdes bisulcatus*, new species.**

Scales of palpi and proboscis black, those of the occiput yellow. Mesonotum brown-scaled, a pair of subdorsal bare lines on its anterior three-fourths. Abdomen black-scaled, the front angles of the segments whitish-

scaled. Scales of the legs black, those on under side of femora basally whitish; claws of the front and middle tarsi of the male with a tooth under one claw, none under the other, those of the hind feet simple; female with all the claws simple. Scales of wings brown. Length about 3 mm.

Guadeloupe and Santo Domingo, West Indies. Two males and one female, collected by Mr. A. Busck.

Type.—No. 8291, U. S. National Museum.

The larva differs widely from that of *Aedes fuscus*; the body bears many large clusters of rather short, stiff hairs, and there are about eight tufts on the breathing tube.

***Sabethoides undosus*, new species.**

Near *confusus*, but the dorsum of the abdomen is not white-scaled in the front angles of the segments. Scales of proboscis and palpi purple, those of the occiput violet-purple, a large patch of white ones each side. Mesonotum and scutellum mixed metallic blue-, green-, and coppery-scaled, the humeri violet-scaled, the lower portion whitish, scales of pleura white. Abdomen purple-scaled, scales of venter white or yellowish, the upper border wavy. Legs purple-scaled, the lower side of the femora and inner side of the tibiae brassy-yellow-scaled; tarsal claws simple. Wings hyaline, the scales brown. Length 3 mm.

Trinidad, W. I. Ten specimens collected by Messrs. F. W. Urich and A. Busck.

Type.—No. 8292, U. S. National Museum.

A NEW MYRMELEONID FROM THE UNITED STATES.

BY ROLLA P. CURRIE.

***Brachynemurus irregularis*, new species.**

♀.—Hardly slender, yellowish, marked with light brownish; with black hairs, especially on the abdomen. Face yellowish, brownish above; inter-antennal mark rather short, emarginate, bordering the antennae in front and sending a median line to the clypeus. Labrum about twice as wide as long, yellowish, rounded anteriorly. Palpi subequal, slender, cylindrical, yellowish, the last joint of each tinged with brownish piceous apically; last joint of labial palpi slender fusiform. Under parts of head yellowish; maxillary palpigers piceous at elbow (faintly) and near apex; a piceous clouding on each side of gula. Antennae considerably shorter than head and thorax, strongly clavate, fuscous, articulations yellowish; joints 1 and 2 piceous, with yellowish articulations, 1 set in a yellowish ring. Vertex yellowish, with a pale brownish median stripe along longitudinal furrow, embracing a median fuscous spot on each side.

Thorax yellowish, with a broad longitudinal mid-dorsal stripe, divided lengthwise by a fine pale median line; on the anterior lobe of the mesonotum this stripe embraces a yellow spot each side, while on the anterior lobe of the metanotum it consists of two separate spots; on the posterior lobe of meso- and metanotum the stripe narrows posteriorly and terminates same distance before the hind margin of the lobe, on which there is a dark median small spot; lateral lobes of meso- and metanotum brown marked with yellow; posterior lobe of metanotum bordered in front with black; sides of thorax light brownish, spotted with yellowish; sterna mostly yellowish.

Abdomen yellowish, obscurely marked with brownish, especially on dorsal carina, lateral sutures, and articulations of segments, the apical half of abdomen darker; tip with a number of very stout black spines, the inferior appendages with long apical hairs. Legs yellowish, beset with large and small black spines and hairs; bases of spines, a ring before middle of tibiae (interrupted within), and tip of tibiae and tarsal joints, piceous. Tibial spurs hardly as long as first, and claws considerably shorter than fifth, tarsal joint.

Wings a little shorter than abdomen, rather broad, hyaline, tips pointed, the forewings obtusely; a series of fuscous spots between subcosta and radius, and faint cloudings on transversals, and on small forks at apex and hind margin of the wing. Longitudinal veins yellowish, interrupted at cross-veins and at forks with fuscous; cross-veins mostly fuscous, some of the intercostals interrupted with yellowish; pterostigma yellowish, fuscous within, a few intercostals forked before it. First cross-vein basad of radial sector curved around to meet the first cross-vein from radial sector to median vein (in the type specimen).

Abdomen 23 mm.; hind wing 21.8 mm.; greatest width of anterior wing 7.1 mm.; antenna 4.3 mm.

Columbus, Tex. (E. A. Schwarz, coll. C. V. Riley: 1 ♀); Columbus, Tex., June, 1879 (E. A. Schwarz, coll. C. V. Riley: 1 ex.); Havana, Ill. (C. A. Hart, Ill. St. Lab. No. 24,553).

Type.—No. 8313, U. S. National Museum.

In the second specimen from Columbus, Tex. the first cross-vein basad of radial sector (on the left anterior wing) sends a branch to the first cross-vein connecting radial sector and median vein, and there is an incomplete vein running from the second cross-vein basad of the radial sector towards the first. These peculiarities might not have been noticed were it not that the specimen from Havana, Ill. has a branch connecting all these cross-veins except the basal one (all but two basal ones in right hind wing), thus forming an almost complete double series of areoles in the space between origin of radial sector and the base of the wing. Mr. Nathan Banks

called my attention to the venational peculiarities in the Illinois specimen and suggested that it might belong to the genus *Calinemurus*. In that genus as characterized, however, the venation is even more irregular and there is a double row of intercostal areoles almost to the base of the wing (in *irregularis* a single row, with a few forked veins before the pterostigma). No one would, I think, regard the Texas specimens as sufficiently peculiar in venation to place them outside of *Brachynemurus*, for there are specimens of *B. mexicanus*, *niger*, *brunneus*, etc., also, in which one or two of the areoles nearest the radial sector are double; and it is evident that the Havana specimen is merely an example, of the species here described, in which these irregularities are carried further.

ON THE CLASSIFICATION OF THE CULICIDÆ

BY HARRISON G. DYAR.

I have previously thought from an examination of a considerable material of culicid larvæ, that there was no character to separate the *Aëdinæ* as larvæ from the *Culicinæ*. Further research has resulted in the interesting discovery that this is only so if Theobald's classification be used. A classification proposed by Dr. Lutz¹ and quoted in R. Blanchard's work "Les Moustiques," Paris, 1905, page 619, corresponds exactly with larval characters, and is evidently the best and most natural classification yet proposed. Doctor Lutz has arrived at this happy result, not by the use of any new characters but by changing the order of importance of the old ones. The relative length of the palpi in the sexes, heretofore regarded as a character of first importance, is relegated to a subordinate place and with obvious justice. This is a secondary sexual character, one that by some systematists is not allowed to be of even generic value. It should never have been used to define subfamilies. The worthless scale characters used by Theobald are discarded and most properly so. I am speaking of primary divisions, or subfamilies, not having gone into the question of genera in this connection. The scale characters may be of use in generic definition, although I doubt it.²

¹In C. Bourroul, Mosquitoes do Brasil, Bahia, 1904.

²See the complete refutation of the value of scale characters in generic definition given by James and Liston in their admirable account of the *Anopheles* of India. "A Monograph of the *Anopheles* mosquitoes of India," by S. P. James, M. D., I. M. S., and W. Glen Liston, M. D., I. M. S., Calcutta, 1904. See pages 19-21.

Theobald's classification is as follows, thrown into dichotomous form:

- | | |
|---|-------------------------------------|
| 1. Metanotum nude | 2 |
| Metanotum with chaetae | 5 |
| 2. Palpi long in the male | 3 |
| Palpi short in both sexes | ÆDEOMYINA |
| 3. Palpi long in both sexes | ANOPHELINA |
| Palpi of the female shorter | 4 |
| 4. First submarginal cell much smaller than second posterior cell | |
| | MEGARHINA |
| First submarginal cell as long or longer than the second posterior cell | CULICINA |
| 5. Metanotum with chaetae only | Genus <i>W'yeomyia</i> ¹ |
| Metanotum with chaetae and scales | TRICHOPROSOPONINA |

The genera included in Volume I are as follows; the later additional genera do not essentially affect the scheme:

ANOPHELINA—Anopheles.

MEGARHINA—Megarhinus, Toxorhynchites.

CULICINA—Janthinosoma, Psorophora, Mucidus, Eretmapodites, Stegomyia, Armigeres, Culex, Panoplitus, Tæniorhynchus, Deinocerites.

(Section, without name)—Wyeomyia, Sabethes.

ÆDEOMYINA—Aèdeomyia, Aedes, Hæmagogus, Uranotænia.

TRICHOPROSOPONINA—Trichoprosopon (=Joblotia).

The following is Lutz's classification, thrown into tabular form and shorn of the superfluous descriptive terms:

- | | |
|--|--------------|
| 1. Larvæ without respiratory siphon | ANOPHELINÆ |
| Larvæ with respiratory siphon | 2 |
| 2. Proboscis curved | MEGARHININÆ |
| Proboscis straight | 3 |
| 3. Metanotum without hairs | 4 |
| Metanotum with hairs | 5 |
| 4. Palpi long in the male | CULICINÆ |
| Palpi short in the male | ÆDINÆ |
| | HÆMAGOGINÆ |
| 5. Palpi more or less long in the male | HYLOCONOPINÆ |
| Palpi short in the male | DENDROMYINÆ |

With the following genera:

ANOPHELINÆ—Aldrichia, Anopheles, Arribalzagia, Cellia,

¹ So given in the table but treated as belonging to the Aèdeomyina.

Cyclolepteron, Myzomyia, Myzorhynchus, Nyssorhynchus, Pyretophorus, Stethomyia.

MEGARHININÆ—Ankylorhynchus, Megarhinus, Toxorhynchites.

CULICINÆ—Acartomyia, Bancroftia, Culex, Desvoidya, Finlaya, Gilesia, Grabhamia, Howardina, Janthinosoma, Lasioconops, Lutzia, Mansonia, Melanoconion, Mucidus, Psorophora, Skusea, Stegomyia, Tæniorhynchus, Theobaldia.

HÆMAGOGINÆ—Gualteria, Hæmagogus.

AEDINÆ—Aëdomyia, Aëdes, Aëdinus, Deinocerites, Ficalbia, Mimomyia, Uranotænia, Verrallina.

HYLOCONOPINÆ—Binotia, Gœldia, Hyloconops, Joblotia.

DENDROMYINÆ—Dendromyia, Limatus, Phoniomyia, Sabettinus, Sabettoides, Sabettus, Wyeomyia.

It will be seen that Lutz bases his primary divisions on larval characters, which is not allowable in a table for adults. The Anophelinæ should be separated on some adult character. The palpal character heretofore used is weak; but some other may be found, perhaps in the very long slender legs, or elongate thorax. The Megarhininæ are separated by Lutz on the curvature of the proboscis, which will not hold. By Theobald, the venation is used; but the character seems to me a weak one, as it consists in the relative degree of stalking of two pairs of veins only. I am inclined to throw the Megarhininæ in with the Culicinæ, where they fall near to Psorophora and Lutzia, the larvæ of these three genera being exclusively predaceous. The really strong character in Lutz's table is the presence or absence of setæ on the metanotum; the scales do not count. I think, and am supported by larval characters, that the rest of Lutz's subdivisions, based on the palpi, are weak and should be dropped. We have really only three subfamilies of the Culicidæ, definable on sound characters both as adults and larvæ.

I. ANOPHELINÆ. Adults¹: metanotum nude; palpi long in both sexes. Larvæ with sessile air tube; dorsal fan-tufts for attachment to the water film.

Genera.—Anopheles, Cellia, Cyclolepteron, etc.

II. CULICINÆ. Adults: metanotum nude; palpi only rarely long in the female, usually long in the male, occasionally short in both sexes. Larvæ with an elongate air tube; no fan-tufts for attachment to the water film; anal segment with a ventral brush or rudder.

Genera.—Megarhinus, Psorophora, Lutzia, Culex, Grab-

¹ Some good adult character for the separation of the Anophelinæ can surely be found.

hamia, Howardina, Janthinosoma, Melanoconion, Stegomyia, Tæniorhynchus, Theobaldia, Hæmagogus, Aedes, Deinocerites, Uranotænia, Verrallina, etc.

III. SABETHINÆ. Adults: metanotum with setæ; palpi short in the female, usually short also in the male. Larvæ with elongate air tube and no fan-tufts; anal segment without ventral brush.

Genera.—Joblotia, Dendromyia, Limatus, Phoniomyia, Sabethoides, Wyeomyia, etc.

I have given only the genera of which larvæ are known to me; but have no doubt that the other larvæ, when known, will prove consonant with these divisions.

Subdivision of the Anophelinæ, except generic, seems unnecessary. The Culicinæ can be divided into tribes, one the Megarhinini, to contain Megarhinus, Psorophora and Lutzia, the other, the Culicini, for the remaining genera. I see no propriety in recognizing the Aëdinæ or even Aëdini, as the character of short male palpi is not more than of generic rank and the larvæ show no differential characters whatever. The Sabethinæ need no subdivision, unless Joblotia be taken out, in many respects a unique form.

It has been shown that the Anophelinæ are distinguished by their attitude while alive; this is now given in all the text books. The Culicinæ and Sabethinæ are equally distinguishable, the latter curving the hind legs over the back far forward in a very characteristic manner, as described to me by Mr. Knab and Mr. Busck, who have seen many of the species alive.

OCTOBER 5, 1905.

The 198th regular meeting was held at the Sængerbund Hall and there were present the following: Messrs. Barber, Couden, Doolittle, Dyar, Heidemann, Howard, Marlatt, Morris, Quaintance, Schwarz, Stiles, Titus, and Webster, members; and Messrs. Boettcher, Clemons, Coleman, and Martin, visitors. In the absence of the executive officers Dr. L. O. Howard presided.

Prof. Hermann Muckermann, S. J., Sacred Heart College, Prairie du Chien, Wis., was elected a corresponding member.

Mr. Heidemann exhibited specimens and reported the capture of *Tettigia hieroglyphica* Say, family Cicadidæ, at Great Falls, Md. The species was described from Florida, and this is the first report of its occurrence near Washington, D. C.

Mr. Douglas Clemons was the first, on June 27, 1905, to notice the presence of this insect, and after securing one specimen, several parties were made up from the National Museum and attempts made to get additional ones. As a result of five trips, four specimens were captured. Mr. Clemons stated that these cicadas were very hard to locate among the tops of the tall trees. The throwing of stones and other missiles would not disturb them, simply making them sing the louder.

—Mr. Heidemann then exhibited specimens and presented the following notes on a species of *Ceratocombidæ*:

A NEW GENUS AND SPECIES OF THE HEMIPTEROUS FAMILY CERATOCOMBIDÆ FROM THE UNITED STATES.

BY O. HEIDEMANN.

Messrs. E. A. Schwarz and Douglas Clemons have lately found a new hemipteron which I identified as a ceratocombid. Members of this family are spread all over the world. In 1852, Prof. O. M. Reuter monographed the family, dividing it into two subfamilies, *Ceratocombinæ* and *Schizopterinæ*. The first has 3 genera and 13 species, the other 6 genera and 14 species. More recently Prof. P. R. Uhler described some species from the West Indies and two others from Las Vegas Hot Springs, New Mexico. One or more additional species are known to me from the eastern States. Our peculiarly formed tiny insect, which is not much over 1 mm. long, belongs to the second subfamily. It has a striking resemblance to a species described by Reuter from New Caledonia,* *Hypselosoma oculata*. The general outlines are nearly the same, but judging from Reuter's figure our species differs in having a distinct raised venation with cross-veins forming a few cells on the elytra. Moreover, our species seems to have a broader head and comparatively shorter body, and I think we may safely consider it as representing a new genus.

***Glyptocombus*, new genus.**

Body broad and oval, very convex, somewhat pointed towards the apex. Head transverse, its width taken from eye to eye half the length

* *Monographia Ceratocombidarum orbis terrestris. Acta Soc. Scient. Fenn., XIX, No. 6, p. 26, 1863.*

of the whole body, and broader than the basal part of the pronotum; vertex triangularly rounded, front depressed, vertical, clypeus small, narrow, slightly protruding in front, blunt at tip, transversely wrinkled and shining. Eyes extremely large, twice as long as broad, reniform, somewhat coarsely faceted. A remarkable feature is, that the eyes reach down to the lateral margins of the pronotum beyond the middle. Antennæ four-jointed and inserted in front of the eyes near the inner side; first two joints cylindrical, very slightly thinner towards the base, the others slender, beset with fine, long bristles. Rostrum three-jointed, quite robust, and a little curved. Pronotum twice as broad as long, moderately convex; lateral margins behind the eyes short; anterior margin between the eyes faintly depressed, with a transverse grooved line behind it, giving that part of pronotum a neck-like appearance; before the disk of the pronotum two smooth indentations; posterior

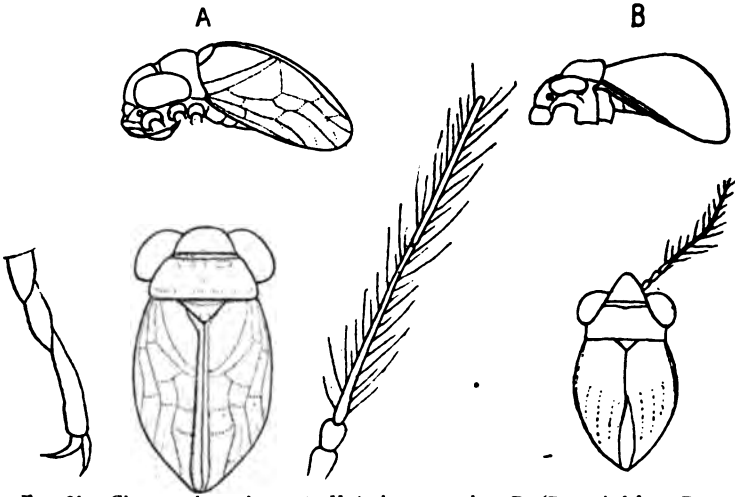


FIG. 21.—*Glyptocombus saltator*, A; *Hypselosoma oculata*, B. (B, copied from Reuter.)

margin slightly decurved. Scutellum broad, triangular, a deep impression near the base, the tip a little tumid. Hemelytra high and very convex, bending around the sides of abdomen and slightly surpassing the same; lateral margins of the elytra gently rounding from the base to behind the middle, then strongly curving to the apex. Veins and cross-veins very distinctly visible, a little raised, forming some cells. The inner margin of the elytra runs from the scutellum to the apex of the body and has the membrane subparallel, narrow, a little widening behind, where it is coriaceous like the elytra. The anterior cavity for the insertion of the front legs is very prominent and tumidly formed. Legs comparatively long; front femora not shorter than the tibiæ, the

latter a little inflated at tip; hind legs the longest, the femora not saltatorial, although the insect has the jumping habit; tibiae slightly longer than the femora; tarsi three-jointed, basal joint of the posterior tarsus a trifle shorter than the second joint. Abdomen highly rounded, a little shorter than the hemelytra.

***Glyptocombus saltator*, new species.**

Body dull blackish, sparsely covered with fine, silvery hairs, which are more dense on the pronotum and head. Eyes somewhat shining, black. Antennae honey-yellowish, basal joint but slightly longer than second, the third a little abruptly thickened at base and nearly equal in length to the fourth, which is more hairy. Rostrum yellowish brown, reaching to the middle coxae; second joint somewhat longer than the basal one; the last very short, much pointed, and darker at tip. Pronotum with a slight longitudinal impression and also a transverse one before the posterior margin; the surface finely rugulose. Lateral margins of the scutellum cinereously spotted. Hemelytra remotely but deeply punctured; the raised nervures covered with a cinereous film. Legs yellowish-brown, pilose, having also some short, stiff hairs; the femora, basal part of tibiae, and tip of tarsi darker. Underside of abdomen dull blackish and densely pilose, with the apex of the abdominal segments fringed, the last segment partly polished.

Length 1.2 mm.; width 0.6 mm.

Four specimens, Plummers Island, Md., September 9, 1905 (Clemons), October 4, 8, 1905 (Schwarz, Heidemann).

Type.—No. 9785, U. S. National Museum.

This species is most difficult to collect and is only to be found by sifting fallen leaves, rubbish, and earth. The collector must watch patiently until the minute insect makes its presence known by jumping, and even then it takes a skillful hand to secure it in a vial. After many efforts we collected only four specimens.

—Dr. Howard described a sifting machine recently made by Prof. Berlese, of Florence, Italy. He had had the good fortune to witness the machine in operation and hence could testify to its actual value as a collector. Briefly described, the sifter consists of a tray made of wire netting into which a bushel or less of the material to be sifted is placed. The tray rests on a funnel at the lower end of which is placed the collecting vial. This funnel is surrounded by a box containing water which is heated by means of a gas jet or alcohol lamp.

—Mr. Quaintance exhibited specimens of the larvæ, pupæ, and adults of *Tischeria malifoliella* Clemens, family Tineidæ. He also showed apple leaves mined by the larvæ. The leaves bore mines of four generations of larvæ, there being from 23 to 46 to a leaf. Larvæ of the fourth generation, it was stated, winter in the fallen leaves on the ground; some of these were also shown with the specimens in their winter quarters. The species was said to have been very abundant in the vicinity of Washington the present year; and specimens had been received by the Bureau of Entomology from Delaware, Maryland, Virginia, and Pennsylvania.

—Prof. Webster exhibited a necklace formed of earth pearls, *Margarodes trimeni* Giard, family Coccidæ. This coccid is found in South Africa on the roots of a species of *Rhus*. The natives collect the pearls and after stringing them sell them as the Indians do beads or the South Sea Islanders do shells. They are worn as necklaces, belts, and bracelets. Prof. Webster remarked on the variation in color of the different specimens from nearly pure white to brown and golden with greenish metallic lustre. Dr. Howard made a few remarks on the Jamaica specimens of *Margarodes* collected several years ago by the late Mr. H. G. Hubbard and exhibited before the Society. Mr. Hubbard's specimens had been cleaned very carefully and present a finer appearance than those usually seen.

—Dr. Dyar spoke of a futile attempt made to find larvæ of *Monoleuca semifascia*, family Cochlidiidæ, in North Carolina this year. This is the only species described from this region of which we do not now know the larva.

—Mr. Schwarz spoke of a difficulty experienced in the preparation of the lists of the insects collected on Plummers Island, Maryland—a difficulty that has also been experienced by the botanists—namely, that many common species the occurrence of which on the island is unquestionable could not be listed on account of the actual absence of specimens. One is so much more apt to pay attention to the rarer species than to pick up those common and well-known. Over 1,100 species

of Coleoptera are now known from this island which has an area of not more than six or seven acres.

—Mr. Barber exhibited specimens of the larvæ and adults of two species of *Phengodes* and also some photographs of different portions of the insects for comparison, and presented the following note:

NOTE ON PHENGODES IN THE VICINITY OF WASHINGTON.
D. C.

BY H. S. BARBER.

The following observations on beetles of the lampyrid genus *Phengodes* are deemed worth while recording, although they are mainly in corroboration of those made by Prof. George F. Atkinson and published some years ago.¹

During the past three years about a dozen larvæ or larviform females of *Phengodes* have been found in this vicinity, but males of the genus have not been taken here before this year, when two species were captured at Plummerville Island, Md. (about 10 miles up the Potomac River from this city). They were *P. plumosa* and *P. laticollis*.

On June 17 of this year I found an adult female in the Zoölogical Park, about 11 o'clock on a bright moonlight night. Two nights later it was exposed in a jar with earth on Plummerville Island and about quarter past nine o'clock a male (*P. laticollis*) was found attempting to enter the jar. Copulation, lasting about two minutes, was observed a few minutes later, and the act might have been repeated had not the male been removed in the hope of luring another. The male was not luminous.

On July 1, the female was observed rolled up in the soil and within the coil of her body about 20 eggs had been laid. On the 6th the number of eggs had been brought up to 53 or more. The female was then greatly shrunken and weak, but still alive and luminous. The eggs were not luminous.

The female retained luminosity till about August 10, when the jar became rather dry, but a few young larvæ were found to have hatched out a few days later. Owing to my absence during the next two weeks the jar dried out and all the young larvæ died.

¹ Journ. Elisha Mitchell Scientific Soc., Vol. iv, Pt. ii, p. 92, 1887.

Mr. Schwarz stated that the species described and figured by Dr. Erich Haase as *Phengodes hieronymi*¹ did not belong at all to this genus.

—Dr. Howard spoke of the remarkable change that has taken place lately in Italy in the old malarial districts around Rome and Naples. There are few mosquitoes present in those regions, and the disease has practically been wiped out by the use of the best sanitary means that could be found available by those in charge of the work.

¹ Deutsche Ent. Zeits., xxxii, pp. 155 ff., pl. i, 1888.

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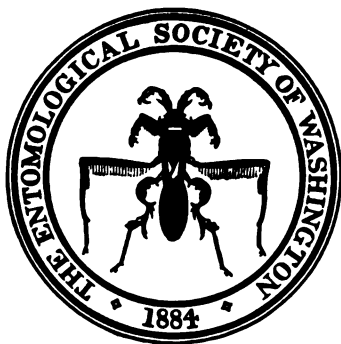
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ERRATA ET CORRIGENDA.

- Page 1, line 5, after Heidemann insert Hopkins.
5, line 12, for only read second.
17, line 13 from bottom, for *yathigerum* read *cyathigerum*
19, line 14 from bottom, for *mudidum* (Hagen) read *assimilatum*.
(Uhler).
50, line 2 from bottom, for + read \pm
105, line 12, for Oregon read Washington.
105, line 13, omit feeding.
105, line 13, for flowers read leaves.
128, line 4, for disposal read dispersal.
150, line 9 from bottom, for *Cypophaga* read *Cyphopyga*.
157, line 3, for *parvula* D. T. read *nigritula* Friese.
157, after line 10 insert 1902: Friese, Zeits. f. Hym. Dipt., p. 109
(*O. ni gritula* n. n. for *parvula*).

PROCEEDINGS
OF THE
ENTOMOLOGICAL SOCIETY
OF
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WM. H. ASHMEAD,	O. HEIDEMANN,	
AUGUST BUSCK,	H. S. BARBER.	

PROCEEDINGS
OF THE
ENTOMOLOGICAL SOCIETY
OF WASHINGTON

VOL. VIII. MARCH-JUNE, 1906 Nos. 1-2.

NOVEMBER 2, 1905.

The 199th regular meeting was held at the residence of Dr. Ch. Wardell Stiles, 1412 Hopkins street, N. W., with the president, Mr. Banks, in the chair. The following were present: Messrs. Ashmead, Banks, Barber, Burke, Busck, Caudell, Dyar, Gill, Girault, Heidemann, Hopkins, Knab, Marlatt, Morris, Patten, Quaintance, Schwarz, Scott, Stiles, Titus, Ulke, Webb, and Webster, members, and Messrs. F. W. Godling, E. F. Phillips, and O. W. Barrett, visitors.

Doctor Stiles presented an explanation of the system of card catalogues in use in the laboratories of the U. S. Public Health and Marine Hospital Service, illustrating his remarks with the various types of cards used in the catalogues. Some general discussion regarding the system and also regarding the compilation of a list of all described genera of the world was participated in by members present.

—Doctor Ashmead spoke of a new and remarkable genus of Chalcididae, parasitic on mantid eggs, that had been recently received from Father Robert Brown, of Manila, P. I. He noted the fact that so many groups that have no spines on the thorax in our country are represented in the tropics by genera provided with spines.

—Mr. Caudell exhibited specimens of the various species of the true katydids (Cyrtophylli) from North America, comprising, in his opinion, three genera and six species. He had examined about 100 specimens and found many striking characters separating the species. In answer to a query regarding the

breeding habits, Mr. Caudell stated that the species, so far as known, live in trees, rarely forsaking the tops and then only, apparently, for the purpose of oviposition. One species has been found ovipositing at night in the bark of a tree near the ground. In one species of this group the female has the power of stridulation—something unknown for this sex in any other group of Orthoptera. Some considerable discussion regarding the ability or non-ability of the insects to fly took place. So far, there is no absolute case known of the insects flying, but some of the members believed that they do fly at times and probably at the mating period.

—Doctor Dyar exhibited the recently issued second volume of Packard's "Monograph of the Bombycine Moths of America North of Mexico," published as a memoir of the National Academy of Sciences. This volume was edited by Samuel Henshaw after Professor Packard's death and treats only of the *Ceratocampidæ*. A remarkable feature of the plates noted by Doctor Dyar is that all the larvæ are figured upside down. Larvæ in this group always cling to the underside of the twig or leaf upon which they are feeding.

—Doctor Gill made a few remarks on the present erroneous use by several authors of the termination *oidea* for families. Its well-established application as a termination for super-family groups should preclude the use for any other group.

—Mr. Busck exhibited specimens of a peculiar large anthomyiid fly (*Mydæa pici* Macq.) which is parasitic on small birds in Santo Domingo, W. I. The eggs are laid on the young nestlings and the larva develops in a sac on the head or on the wing of the bird, which, when of small size, is sometimes curiously malformed by the large parasite. The species was described in 1853^a from a specimen bred from the wing of a young pigeon in Santo Domingo. The present specimens were bred from a young specimen of the small palm-chat, *Dulus dominicus* L., which was shot on September 8. The larva left the bird the same day, burrowed into earth provided for it in a box, and made a cocoon of particles of earth glued together by a glistening white excretion.

^a Ann. Soc. Ent. France, p. 659, Pl. xx, Fig. 11.

The fly issued on September 18. The species is evidently common, the number of small birds affected in that locality amounting to nearly 90 per cent, but the injury is not necessarily fatal and old birds often showed the shriveled up larval sac, indicating infestation in earlier life.

—Mr. Busck spoke also on the presence in Trinidad of the bot-fly that attacks human beings. He stated that many of the coolies are infested with these larvæ.

Mr. Barrett spoke of an experience he had had with this bot-fly while in Mexico, and has since furnished the following abstract of his remarks:

NOTES ON THE MAN-INFESTING BOT IN MEXICO.

By O. W. BARRETT.

[*Author's Abstract.*]

Regarding his experience with the so-called *Dermatobia hominis*, the writer would say that he personally knew of its wide occurrence in the Tuxtla district of Vera Cruz, Mexico, a locality about seventy-five miles southeast of the city of Vera Cruz; it was in the year 1897 when he visited that section and "took the notes."

There are at least three theories for the entrance of the larva beneath the skin. The one that seems most probable is that the newly-hatched grub can crawl some little distance before beginning to burrow. The first symptoms of the attack are intense itching and burning at the mouth of the burrow, which is greatly swollen and reddened. At about the second week of the existence of the larva inside the burrow sharp pains are felt as if nerves were being severed. At the second week, also, begins a slight exudation of serum. Attempts to dislocate the larva by physical means are unavailing on account of the retroverted setæ along the slender caudal portion of the insect. The burrow eventually becomes of some 10 to 20 millimeters in depth, with an opening of 1 to 2 millimeters. The larva is of a dead white color, with dark brown or blackish setæ.

Badly parasitized individuals are likely to suffer from the septic effects of larvæ crushed within the burrows, and of course the pain and worry have a bad psychological effect.

The smothering method of killing the larva is one of the most convenient and successful; fresh "chicle" (*Achras*

sapota gum) or court plaster is used. Cigarette ashes are sometimes worked into the larva sac but tend to increase the irritation and seldom kill the insect.

Mr. Titus mentioned that Mr. R. J. Crew, when collecting in British Guiana, found that he had one of these larvæ in the calf of his leg, but was unable to breed it out on account of the severe pain and probability of blood-poisoning following the attack. He had the larva removed after reaching his home in Canada. Mr. Knab noted that on his recent trip to Central America and Mexico he had seen several cases where the larva was present in human beings. Doctor Stiles stated that this species was known to occur in hogs, dogs, and monkeys on the Isthmus of Panama.

—Dr. F. W. Goding, U. S. Consul at Newcastle, New South Wales, was introduced and spoke several minutes on the entomological conditions in Australasia. He stated, among other things, that the museums in those colonies would be glad to send their specimens to this country and get them worked up.

—Doctor Hopkins then presented the following paper and exhibited specimens and work of several of the species treated:

**BARKBEETLE DEPREDATIONS OF SOME FIFTY YEARS
AGO IN THE PIKES PEAK REGION OF
COLORADO.**

By A. D. HOPKINS, Ph.D.

In the course of my studies of forest insects in different sections of the Rocky Mountain region during the past six years, I have been specially interested in the frequent evidences of wide-spread depredations by barkbeetles, found on old, dead, and fallen timber. During investigations last month (October, 1905) in the Pikes Peak region of Colorado much additional evidence was found on old, dead, standing, and felled trees of the work of the Black Hills beetle (*Dendroctonus ponderosa* Hopk.) on pine, the spruce-destroying beetle (*D. piceaperda* Hopk.) on Engelmann spruce, and the Douglas spruce *Dendroctonus* (*D. pseudotsugæ* Hopk.) on Douglas spruce, indicating that all of these species have been present and destructive to living timber in this region for from thirty to fifty years. The number and distribution of such old beetle-marked trees indi-

cate that very extensive depredations have been wrought by these barkbeetles in the Pikes Peak region within the past century, and present conditions also indicate that a large per cent of the vast destruction of timber heretofore attributed to fire was primarily due to the work of these insects.

This was particularly striking on the southern slopes of Pikes Peak, at an altitude of about 10,000 feet, where nearly all of the timber had been killed some fifty years ago. In the fragmentary patches of living timber old felled trunks of a primitive matured forest of Engelmann spruce were found thickly covering the ground. On the weatherbeaten surface of these logs the characteristic markings of the galleries of *Dendroctonus piceaperda* were so common as to leave little doubt that the trees had been killed by a destructive invasion of this species—indeed quite conclusive evidence of this is found in the presence of dried resin in the grooves, which would not be found there if the trees had been attacked after they were dying from other causes.

This additional evidence, together with the known devastating work of this class of insects, makes it clear to me that there has been a most intimate interrelation of destructive barkbeetles and forest fires in the denudation of the vast areas of once heavily forested lands in the Rocky Mountain region, and that in very many cases the insects have first killed the timber, and the fire has then followed, leaving the charred trunks and logs as apparent proof that the fire alone was responsible.

DECEMBER 7, 1905.

The 200th regular meeting was held at the residence of Mr. C. L. Marlatt, 1440 Massachusetts avenue, N. W., the president, Mr. Banks, occupying the chair. The following persons were present: Messrs. Ashmead, Banks, Barber, Barrett, Burke, Busck, Casey, Caudell, Couden, Currie, Doolittle, Dyar, Fairchild, Fiske, Gill, Heidemann, Hopkins, Howard, Hunter, Knab, Marlatt, Patten, Piper, Quaintance, Schwarz, Stiles, Titus, Uhler, Webb, and Webster, members, and Messrs. Douglas H. Clemons, E. R. Sasscer, George R. Stetson, and J. F. Strauss, visitors. The minutes of the November meeting were read and approved.

Three persons were elected to active membership, namely, Mr. Jasper M. Lawford, of 718 North Howard street, Balti-

more, Md.; Mr. O. W. Barrett, of the Bureau of Plant Industry, U. S. Dept. of Agriculture; and Dr. E. F. Phillips, of the Bureau of Entomology, U. S. Dept. of Agriculture.

The resignation from membership of Mr. C. L. Pollard was presented and accepted.

By vote of the Society the whole matter of the future publication of the PROCEEDINGS OF THE ENTOMOLOGICAL SOCIETY OF WASHINGTON was referred to the Publication Committee with instructions to report at the next regular meeting of the Society.

The following officers were elected for the year 1906: President, Nathan Banks; First Vice-president, A. D. Hopkins; Second Vice-president, O. Heidemann; Recording Secretary, Rolla P. Currie; Corresponding Secretary, E. S. G. Titus; Treasurer, J. D. Patten; additional members of the Executive Committee: H. G. Dyar, L. O. Howard, and C. L. Marlatt.

—Dr. Howard gave an account of his trip to Europe during the past summer, the object of which was to secure, if possible, for introduction into the United States, the parasitic and predaceous enemies of the gypsy moth (*Porthetria dispar* L.) and brown-tail moth (*Euproctis chrysorrhæa* L.).^a Among the localities visited were the Azores Islands, Gibraltar, Naples, Florence, Milan, Vienna, Budapesth, Dresden, Paris, etc. Many photographs illustrating the trip were exhibited. Among the insects secured as of possible value in destroying the gypsy and brown-tail moths he especially mentioned the fly *Tachina larvarum* L. He also spoke especially of the difficulty of importing the European species of *Calosoma*.

In discussing Dr. Howard's communication Mr. Schwarz reviewed the little which is known of the biology of the *Calosomas* of Europe. It seems pretty well established that there is but one annual generation. He said that too much must not be expected of these beetles as gypsy and brown-tail moth destroyers. Nothing appears to be known of the hiberna-

^a Doctor Howard has published an account of this trip in the Year-book of the U. S. Department of Agriculture for 1905 under the title "The Gypsy and Brown-tail Moths and their European Parasites"; pages 123-138.—PUB. COM.

tion of the species of *Calosoma*, although the probabilities are that the beetles winter as full-grown larvæ in the ground. In his opinion the *Calosomas* of the United States do not have the climbing habit so well developed as do the European species.

Mr. Busck stated that in May, 1898, he packed up a number of living adult specimens of *Calosoma scrutator* Fab., collected at the electric lights at the Capitol, and gave them as a curiosity to Dr. Yngve Sjöstedt who had been visiting in the United States at the time. They were placed in a tin box with a large nest of living half-grown *Hyphantria* larvæ for food and were shipped by express to Dr. Sjöstedt's steamer in New York. In a letter a month later Dr. Sjöstedt wrote that the great majority of the beetles had come over in perfect condition and that he had exhibited them alive at the following meeting of the Stockholm Entomological Society. From this experience it was reasonable to infer that European *Calosomas* could be introduced into the United States.

Mr. Schwarz said that carabid larvæ of various species had been successfully reared on a diet of raw meat by the late Prof. F. G. Schaupp, of Brooklyn, N. Y. Doctor Hopkins stated that he had found *Calosoma* beetles of two species very abundant high up in trees badly defoliated by what was supposed to be canker-worms, in Greenbriar County, W. Va. Mr. Knab said that he had found adults of *Calosoma calidum* Fab. —undoubtedly hibernated individuals—in drift and under stones near Springfield, Mass., in the early spring. Mr. Hunter spoke on the common occurrence of *Calosoma scrutator* Fab. in the Texas cotton fields, where there are no trees near. Mr. Titus said that he had collected *Calosomas* under stones in Colorado, at altitudes of from 6,000 to 8,000 feet, during December and January. Mr. Schwarz spoke on the spread in North America of *Carabus nemoralis* Muell., a European species which is now quite common around Boston. He believed that the introduction of large carabid beetles into the United States is quite feasible. Doctor Howard said that he had met with great conflict of evidence among the European naturalists as to the hibernation of *Calosoma*, and stated that

ever since autumn entomologists all over Europe had been hunting for *Calosoma* to send to America. Up to the present time, however, not a single specimen had been found.

Doctor Hopkins said that this effort to introduce parasites of the gypsy moth and brown-tail moth was a most important one, and he thought it would be well to endeavor to introduce the parasites of other defoliating caterpillars also.

—Mr. Banks then presented the following paper:

NOTES ON *PTERONARCYS*, A GENUS OF PERLIDÆ.

By NATHAN BANKS.

The genus *Pteronarcys* comprises the largest of our Perlidæ. Its members have long attracted attention, since the adult insects retain, in a more or less perfect condition, the gills which served them as organs of respiration during their early stages in the water. A similar condition, however, is now known to exist in various other stone-flies. All but one of the six or seven described species of this genus occur in the United States, the single exception being from Siberia. The best characters for the separation of the species lie in the structure of the ninth ventral segment in the male, and of the eighth ventral segment in the female. Lately I had an opportunity of examining the collection of the late Doctor Hagen in the Museum of Comparative Zoölogy, Cambridge, Mass., and now, in going over my own collection, I find that I have a new species, the most distinct one in the genus. It may be described as follows:

Pteronarcys spinosa, n. sp.

Black, scars of head reddish, a narrow reddish stripe on middle of pronotum, ventral segments of abdomen margined with yellowish.

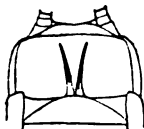


FIG. 1.—*Pteronarcys spinosa*: Eighth ventral plate of female.

Wings not very long; venation dark brown, rather dense; a dark cloud over the first cross-vein between the radial sector and the radius, and extending up into the costal area; another dark cloud near middle of wing and basad of the first one; hind wings with the costal spot, but without the interior one; an elongate black spot near basal costal part of forewings. Female with the 8th ventral segment evenly rounded, and with two long, divaricate, spine-like processes from the middle (fig. 1). Male with the 9th ventral segment broadly truncate at tip, not

covering the 10th, with a scar each side, and a middle area very distinctly separated from the sides by nearly parallel carinae.

Length to tip of wings, ♂, 34 mm., ♀, 39 mm.

One pair from Oregon, from a Mr. Warren.

To show the position of this species in the genus, I have tabulated our forms for both sexes, as follows:

MALES.

1. Ninth ventral segment elongate, tapering to the notched tip, and covering the 10th segment, its surface minutely transversely striate. .4
Ninth ventral segment short, broadly truncate at tip, not covering the 10th; rugose, but not finely striate.2
2. Middle area of 9th ventral segment with nearly parallel sides. *spinosa*
Middle area of 9th ventral segment much broader at base than at tip . .3
3. The scar or concavity on sides of 9th segment not reaching the base, *californica*
The scar extending to base. *proteus*
4. Notch at tip of 9th segment small. *nobilis*
Notch at tip deeper and broader. *regalis* and *pictetii*

FEMALES.

1. Eighth ventral segment without median processes or teeth.4
Eighth ventral segment with two projections from the middle part. .2
2. From middle of 8th ventral segment arise two long, divaricate processes, fully four or five times as long as broad at base. *spinosa*
Two short teeth, barely longer than broad at base on the posterior margin of the 8th ventral segment.3
3. The two teeth but little more than their diameter apart. *californica*
The two teeth plainly more than diameter apart. *pictetii*
4. The 8th ventral segment triangular. *proteus*
The 8th ventral segment truncate at tip. *regalis* and *nobilis*

—Mr. Heidemann exhibited specimens of a new species of *Corythuca* and of other species of the genus for comparison, and presented the following paper:

ACCOUNT OF A NEW TINGITID.

By O. HEIDEMANN.

Corythuca pergandei, n. sp. (fig. 2).

Smaller than the oak or sycamore tingitids. The net-like reticulation of the surface yellowish, the areoles more or less translucent; across the elytra are two brown bands, one at base and the other near apex, the latter one sometimes only faintly colored; the membranous pronotal margins also partly infuscated. Body black, except the margin of prosternum, the humeral area, and the last two abdominal segments, which are fulvous; very dark specimens have the abdomen almost entirely black. The pronotal hood, which entirely covers the head, is of moderate size, with the posterior part not very elevated; it is about as long as the triangular portion of pronotum and its posterior globular part is not broader than one of the membranous pronotal margins; it is abruptly constricted at about the middle, from there tapering gradually towards front and forming an apex which, viewed from the side, is

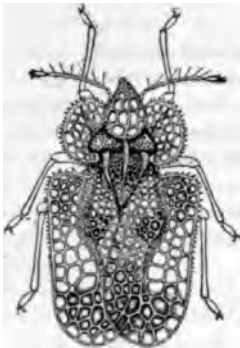


FIG. 2.—*Corythuca pergandei*: Adult.

hook-like. The areoles of the globular portion of the hood are quite large, hexagonal or pentagonal, the others smaller and irregular. Antennæ slender, pilose, and pale yellowish, sparsely beset with a few very long, bristly hairs, the apical joint knobbed at tip, usually darker in color; the third one hardly more than twice the length of the two basal joints taken together; second joint shortest, half as long as the first. The rostrum enclosed in the rostral groove, which is rounded and closed behind, reaches the base of the metasternum. The membranous pronotal margins are bean-shaped and the surface is much sunken before and behind the middle, with the areoles nearly uniform in size.

Pronotal processes broadly triangular, deeply punctured at base and irregularly reticulated towards the apex; the lateral margins only raised anteriorly, having a few cells. Middle carina feebly elevated, hardly one-half as high as the hood, rounding a little from its base and slightly sinuated behind the middle to the tip; it has five or six cells, sometimes one or two additional ones caused by a little cross-vein dividing the middle cell, which is then somewhat embrowned. In some specimens the carina often appears truncated. The elytra when closed are very little longer than broad, rather subquadrate; lateral margins

nearly straight, the anterior and posterior angles broadly rounded; edges of elytra and pronotal margins armed with short, white spines, tipped with black; at the nervures of the hood and near the elevated part of elytra there are also a few scattered spines. Sometimes specimens have the armature a little stronger. Discoidal area irregularly reticulated with four or five rows of areoles, tumidly elevated behind, marked with a brownish spot; the subcostal is biseriate and the costal area has three rows of hexagonal or pentagonal areoles, those on its widest part, mostly at the inner side, very large; on the sutural area before the apex are also a few large hexagonal areoles. Legs yellowish, the tarsi darker at tip. Claspers of the male strongly curved, not hairy.

Length 3.2 mm., width 1.6 mm.

Described from many specimens of both sexes. Some larval forms were also examined. Washington, D. C., February 18, 1884, October 12, 1882 (Pergande), July 18, 1902; Bedford Co., Pa., August 23, 1902; Front Royal, Va., September 10, 1903, May 29, 1904 (Heidemann); Springfield, Mass., August 29, 1902; Urbana, Ill., October 11, 1904 (Knab); Lawrence, Kans. (Tucker).

Type (from Washington, D. C., ♂ and ♀).—No. 8302, U. S. National Museum.

This new species is to be distinguished from *Corythuca ciliata* Say, and from the species occurring on oak by the different shape of the pronotal hood, which is less elevated in both of the latter, and by the fact that in these latter, also, the adjoining middle carina is as high as the globular portion of the hood. It is also distinct from *Corythuca marmorata* Uhler in having the elytra not so much speckled with brownish markings; while *Corythuca incurvata* Uhler differs from it in the great, abrupt height of the hood, and *Corythuca juglandis* Fitch differs from it in the more inflated, globular part of the same.

In one of the note-books of the Bureau of Entomology, Dept. of Agriculture, there is a short account of this tingis by Mr. Th. Pergande under number 2893, as follows:

October 12, 1882, February 18, 1884, found quite a number of Tingis on lower side of leaves of different species of *Alnus* on the Agricultural grounds of Washington, D. C. Mounted winged specimens, marked 2893, and larvæ on slides 3/4/1.5.

No. 2945, November 5, 1882; found several specimens, larvæ and adults of Tingis on lower side of leaves of Hazel. Mounted winged ones, marked 2945, and larvæ on slide 3/1/56.

The U. S. National Museum also contains specimens of this tingis, labeled as found on elm and crab-apple trees. I

have taken specimens from the leaves of black alder as early as May and late in September. The insect hibernates in the adult stage under fallen leaves and in the crevices of the bark.

The eggs of this tingis, which I found on the black alder, are shaped like the eggs of those known to be on oak and are only a trifle larger; this insect has, also, the same habit of depositing its eggs on the underside of the leaves, fastening them to the surface, differing however in that it completely hides them under the dense pubescence of the leaf, in the axil which is formed by the main rib and its side branches. In this way the eggs are entirely out of sight and well protected.

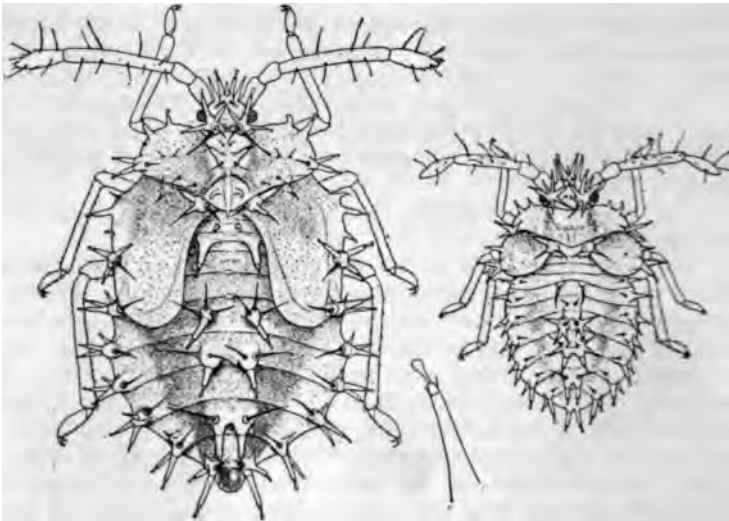


FIG. 3.—*Corythuca pergandei*: Young larva or nymph at right, older nymph at left, enlarged spine between.

The larval forms (fig. 3) are quite similar to those of the oak tingitid, except that the body appears to be less broad. They are armed with the same kind of spines, which Dr. A. W. Morrill in his excellent treatise on the immature stages of some tingitids^a has termed "trumpet-shaped spines, type No. 1, type No. 2, and simple spines, type No. 3." These spines arise from elongated, thick protuberances, or from a conical base, and are situated on the head, at the margins of the thorax, and on the dorsal part and sides of the abdominal

^a Psyche, Vol. x, No. 324, pp. 127-134, August, 1903.

segments. But the larvæ of *C. pergandei* show some differences in their last two stages, in having also some spines belonging to type No. 1, rounded at tip (fig. 3), not trumpet-shaped, and more like those of the nymph of *C. ciliata* Say in the first instar, according to Doctor Morrill. Besides there appear in the last stage or pupal form some long, simple spines of type No. 3, which are not pointed at the end, but slightly inflated. Two very long spines of this latter shape rise from the base of the head, and a few smaller ones from the abdominal segments, dorsally, near the margins. The antennæ are sparsely covered with simple spines and the legs with very short ones. I take pleasure in naming this new species in honor of Mr. Theodore Pergande, who was the first to take notice of this species.

—Mr. Barrett showed several photographs taken by Mr. Fairchild and himself, of bumblebees in the act of mating, and presented the following notes:

NOTES ON THE COPULATION OF *BOMBUS FERVIDUS*.

By DAVID FAIRCHILD AND O. W. BARRETT.

(Plate I.)

While walking across the nursery plats of the Arlington Farm, about October 13, the writers noticed three individuals of a species of *Bombus* clinging to a young cherry tree about six inches above the surface of the ground. Upon close examination it was found that one male, apparently lifeless, was *in coitu* with a female of the same color but slightly larger size, and upon the back of the female another male was actively endeavoring to copulate. The female clung tenaciously to the stalk and paid little attention to the maneuvers of the male upon her back. The male *in coitu* was suspended by the genitalia only, all the legs being held appressed to the body and motionless. Upon irritation with a straw the latter male evinced life only by buzzing of the wings. The male not *in coitu*, which may be designated as male No. 2, was quick to notice any interference in his actions by means of the straw but could not be induced to leave the body of the female.

Presumably copulation had continued for some little time previous to the finding of the specimens and there was no apparent tendency towards its cessation when the coitus was

interrupted forcibly, although so gently and gradually that the female was not greatly disturbed. Male No. 1, immediately after connection was broken, evinced a desire to leave the female, showing no desire whatever to renew the relations. Rapidly regaining activity he soon rose in the air and slowly flew away.

Male No. 2 left the back of the female as soon as male No. 1 had disappeared, and stationing himself about fifty or seventy-five millimeters directly in front of her began a series of complex marches and short charges towards her. The female, though loath to move, resisted these advances and when male No. 2 continued to approach her she made a short charge toward him, buzzing her wings and waving the prothoracic legs threateningly. This procedure was repeated several times until the female had succeeded in impressing male No. 2 with the idea that further advances would be dangerous; she even fiercely attacked the male once or twice as the result of his charges toward her. The female next evinced a desire for flight and rose in the air once or twice but was struck back upon the ground. Here she remained, apparently in a sullen mood and scarcely responding to the straw irritations. Male No. 2, noticing the female's change of mood and probably scenting trouble through outside circumstances, gradually lost his interest in the case, though he remained close to the female until the last.

Five photographs were taken, each showing the three insects *in situ*. In No. 1 the female is clinging to a weed stem while male No. 1 is suspended by the genitalia and male No. 2 is clinging to the female.

—Doctor Dyar presented for publication notes on the collections of mosquitoes made for Doctor Howard under the auspices of the Carnegie Institution of Washington by Mr. August Busck in the West Indies and by Mr. Frederick Knab in western Central America. The results of both trips are very satisfactory. Mr. Busck's region proved richer in species, as would be expected, the west coast of Central America being more arid. Many new larvæ were discovered; Doctor Dyar exhibited sketches of 24 species not hitherto known from our territory. Two of them have been previously described by Goeldi from South America; the others are new to us.

The wealth of ædid larvæ shown in these collections had led Dr. Dyar to hope that some character might appear sepa-



COPULATION OF BOMBUS FERVIDUS.

ENTOMOLOGICAL
SOCIETY OF AMERICA

24X4X600 175X4X4X4

rating the *aëdid* larvæ from the culicids; but such is not the case.*

ILLUSTRATIONS OF MOSQUITO LARVÆ.

By HARRISON G. DYAR, Ph.D.

(Plates II-V.)

Aëdes busckii Coq. (Pl. II, fig. 1).

Head rounded, not angled anywhere, brush concealed; two long spines in front; antennæ short, cylindrical, with single hair near middle. Body hairs moderate, diminishing posteriorly, the short hairs in large stellate bunches. Comb of few scales in a small patch three rows deep with evenly feathered tips. Air tube two and a half times as long as wide, conic, the pecten of six remote long spines with a single hair tuft just beyond the sixth. Anal segment plated, the plate oblique and approaching the brush at the lateral point, spined posteriorly. Tuft normal; side tuft distinct; brush small. Anal gills four, large, white-spotted.

Aëdes mediovittata Coq. (Pl. II, fig. 2).

Head flat behind, rounded on the sides, incised at insertion of antennæ; antennæ slender, cylindric, not exceeding mouth brush, a small hair at middle. Body smooth, all the short hairs developed into contrasting stellate tufts, but the long laterals present also, diminishing a little posteriorly. Air tube one and a half times as long as wide, thick, conic, dark brown; pecten very long and closely set, running in a strongly curved line, followed by a single hair. Comb of seven spines, sole-shaped at base with three-pronged tip. Anal segment half plated, the plate spined at the tip. Dorsal brush large; lateral tuft strong; ventral brush present but without distinct barred area. Anal processes four, short, thick, blunt.

Aëdes albonotata Coq. (Pl. V, fig. 23).

Head rounded, a slight angle at antennæ and posterior margin; antennæ slender, moderate, cylindrical, not very short but weak, with a small single hair, brown. Body hairs diminishing posteriorly, the short hairs rather long and pale, in substellate tufts. Comb of 13 scales in a single curved row, pale, with thick body and feathered tip. Air tube two and a half times as long as wide, the long pecten reaching half way, slightly spirally twisted, followed by a tuft of two hairs. Anal

* See, however, a previously published paper (Proc. Ent. Soc. Wash., Vol. VII, No. 4, pp. 188-191, March 9, 1906), in which it is shown that the *Aëdinæ* are not separable from the *Culicinæ*, but that a subfamily may be recognized for the *Sabethinæ*.—PUB. COM.

segment half plated, oblique, the plate with long spines at the tip. Dorsal tuft, subdorsal one, and ventral brush present. Anal gills four, moderate, about as long as the segment.

***Grabhamia scholasticus* Theob. (Pl. II, fig. 3).**

Antennæ long with tuft at middle, the apical spines with two removed some distance from tip. Air tube inflated, conic, the pecten of four teeth very near the base. Comb of six scales, separate, with rounded bases, the central apical spine longer than the subapical one. Anal segment ringed by the pale plate, the brush preceded by hair tufts to the base. (The anal gills were lost in the specimen and we have not shown them in the figure.)

***Grabhamia infine* D. & K. (Pl. II, fig. 4).**

Head rounded, normal, wider behind, surface sparsely granular; antennæ long, a hair tuft at the middle; labial plate long with radial hairs. Body hairs short, diminishing posteriorly, skin smooth. Comb teeth six, large, subconsolidated, trifold, finely spined. Air tube about three times as long as wide, strongly inflated; pecten of five teeth on basal third, a small tuft before tip. Anal segment short, ringed by the plate, with tufts to the base; brush normal. Anal gills four, slightly tapered, pointed.

***Grabhamia pygmæus* Theob. (Pl. II, fig. 5).**

Head rounded, brown; antennæ short, not exceeding the mouth brush. Thoracic and abdominal hairs of first two segments moderate, the rest slight. Air tube twice as long as wide, short, roundedly inflated; pecten of two teeth near base. Comb of six scales, rounded, with trifold tips, separate. Anal segment weakly chitinized, apparently ringed by the plate; tuft small; brush moderately developed, with tufts along the ventral line to base. Anal gills four, very short, blunt.

***Aëdes knabi* Coq. (Pl. V, fig. 20).**

Head rounded, dark; labial plate with long projecting lateral teeth. Snout abdominal hairs stellate. Comb of many scales in a patch, the scale broad with feathered tip. Air tube twice as long as wide, the pecten closely set, running to the middle, followed by a single hair. Anal segment with a large dorsal plate; brush and tuft normal. Anal gills four, short, blunt.

***Aëdes insolita* Coq. (Pl. V, fig. 19).**

Head rounded, antennæ small, smooth, a single hair at middle; labial plate sharply triangular with central tooth and small side teeth. Body hairs long, diminishing posteriorly, the short abdominal ones long-stellate, but not conspicuous. Comb a large dense patch of spines, with feathered tips. Air tube and plate blackish; tube two and a half times

as long as wide, conic; pecten reaching half way, rather spiral, long, even, followed by a small hair tuft. Anal segment with a large plate; tuft normal; brush present. Anal gills four, small, blunt.

***Aedes laternaria* Coq. (Pl. III, fig. 10).**

Antennæ very long and slender, weak. Comb a large patch of scales with widened, feathered tips. Air tube nearly three times as long as wide, conic, the pecten long, sparse, running to half. Anal segment with dorsal plate reaching well down on the sides, incised on the lateral margin. Brush and tuft present, the brush with small tufts preceding. Anal gills four, moderate, the tips rather sharp.

***Culex daumasturus* D. & K. (Pl. II, fig. 6).**

Head rounded, pale; antennæ slender, rather long, suddenly narrowed at terminal fifth with a large tuft at the set-off. Body moderate, the hairs diminishing posteriorly. Air tube about ten times as long as wide, swollen fusiform at outer third, else uniform; pecten very long, but of few teeth; several small scattered tufts. Comb a large patch of simple, thorn-shaped scales over four rows deep. Anal segment ringed by the plate, the brush posteriorly placed, tuft normal. Anal gills four, slender, rather long.

***Culex lamentator* D. & K. (Pl. III, fig. 8).**

Antennæ thick, unusually heavily spinulated with long spinules, the tuft from a set-off at the outer fourth. Body glabrous. Comb of many small spines in a triangular patch. Air tube long, about six times as long as wide, somewhat conical basally, then straight and even; pecten rather long; a double row of hair tufts along posterior edge of tube with a few small tufts scattered elsewhere. Anal segment ringed by the plate, the brush posterior; tuft normal. Anal gills rather long, tapered.

***Culex inhibitor* D. & K. (Pl. III, fig. 7).**

Antennæ thick, the tuft from a set-off at the outer third. Body glabrous; pecten comb of many scales in a triangular patch. Air tube long and even, about six times as long as wide, the pecten on the basal third, followed by a double row of posterior tufts. Anal segment long, ringed by the plate, the brush posterior. Anal gills moderate, pointed.

***Culex mutator* D. & K. (Pl. V, fig. 21).**

Antennæ large, the tuft from a set-off at the outer third. Body pilose. Air tube about four times as long as wide, the pecten of long spines, half as long as the width of tube, few; followed by a double row of tufts. Comb of many spines in a triangular patch. Anal segment ringed by the plate, the brush posterior. Anal gills long.

Mochlostyrax urichii Coq. (Pl. V, fig. 22).

Head rounded, normal, widest behind, neck with a black ring; antennal insertion angled, mouth brush well developed; antennæ moderate, reaching the end of the mouth brush, uniform, a small tuft at middle. Abdominal hairs moderate, rather stout, diminishing posteriorly. Comb of 12 bar-like spines in a single row. Air tube four times as long as wide, tapered most at before tip, pecten of ten long spines evenly spaced; fifteen large hair brushes along the posterior line, four of them within the pecten; no other hairs. Anal segment longer than wide, ringed by the plate; tuft large; a single side hair; brush large and posterior. Anal gills four, rather long, tapered.

Culex bisulcatus Coq. (Pl. IV, fig. 13).

Head large, broad, square, rounded; antennæ long, slender, the tuft at the middle, terminal spines long; labial plate small, the sides nearly perpendicular, central tooth long. Thorax and abdomen with the usual long hairs, not diminishing much posteriorly, all the short ones black thick stellate bunches. Comb a patch of long spines, scarcely over two rows deep, the anterior row straight and overlapping the posterior, more confused row. Air tube eight to ten times as long as wide with long scattered hairs singly or in pairs; pecten to one-third the length, of long sharp spines, rather remote. Anal segment rather long, ringed, with sharp terminal lateral spines. Brush and tuft normal. Anal gills four, moderate.

Culex conservator D. & K. (Pl. IV, fig. 14).

Head rounded, no broader than long; antennæ slender, cylindrical, minutely spined, the terminal sixth narrow with a large tuft at the set-off; terminal spines long. Body hairs normal, rather long, diminishing posteriorly. Air tube long, slender, six times as long as wide, a little enlarged at base; a few scattered single hairs on the posterior side; pecten a short row at base. Comb a large patch of spines over three rows deep, the single spines narrow with fan-shaped tips. Anal segment widened outwardly, ringed by the plate, the brush posterior; a single small lateral hair. Anal gills four, nearly equal, the lower pair being a little smaller.

Aedes cyaneus Fab. (Pl. III, fig. 12).

Head rounded, roundedly angled at the sides, smooth; clypeal hairs single; antennæ straight, moderate, brown, a single hair slightly beyond the middle. Body moderate, the hair long, normal, diminishing posteriorly, the shorter hairs in stellate bunches. Comb a patch of feathered-tipped scales over three rows deep. Air tube short, twice as long as wide, conic, the pecten teeth distant, running to the middle, followed by a single hair tuft; dark brown. Anal segment with dorsal plate, spinose at the end; brush and tuft present, the brush with scattering

hairs preceding it; a tuft at lower angle of plate. Anal pro-gills small, the upper pair about half as long as the segment, the lower pair still shorter. Body dark, blackish pigmented.

***Aëdes philosophicus* D. & K. (Pl. III, fig. 11).**

Much like *H. cyaneus*, but the tube more sharply pointed, the comb of few spines in a single row, the single spines sharply thorn-shaped instead of with feathered tips.

***Wyeomyia durhami* Theob. (Pl. III, fig. 9).**

Head rounded, roundedly angled at the corners; antennæ small, cylindrical, without tuft, pale brown. Hairs on the body rather numerous, moderate, not diminishing much posteriorly, still long on the seventh segment. Air tube short, twice as long as wide, sharply conic, strongly tapered on the outer half; no pecten; hair tufts above and below of two to three hairs. Comb of five or six large thorn-shaped spines, well separated, smooth. Anal segment short, with dorsal plate and no ventral brush; two addorsal tufts, a tuft at angle of plate and two small subventral ones. Anal gills four, equal, moderate.

***Wyeomyia grayii* Theob. (Pl. IV, fig. 15).**

Head rounded, arcuate before, posterior angles sharp with a small black arc near the angle; antennæ small, slender, smooth, without tuft. Body moderate, hairs abundant, the long abdominal hairs single and not diminishing posteriorly. Comb a single row of spines nearly to the ventral line, some ten large ones above continued by smaller spines. Air tube long, six times as long as wide, basal half cylindrical, distal half conic; no pecten; several scattered hairs. Anal segment short, with dorsal plate; no ventral brush, the tufts addorsal, lateral and subventral. Anal gills four, equal, normal.

***Wyeomyia ulocoma* Theob. (Pl. IV, fig. 17).**

Head round, angled behind, the eyes small, round; antennæ small, tapered without, with no visible hair. Thorax quadrate, transverse, with a thorn at the posterior angle of metathorax. Long hairs few, short ones in stellate bunches, dark, conspicuous. Air tube five times as long as wide, tapered outwardly; pecten of four spine-like scales preceded by a hair and followed by two; several hairs on the dorsal aspect. Comb a thick band of fan-tipped scales covering most of the side, three rows deep, crowded. Anal segment with dorsal plate spined behind; addorsal and lateral long hairs and subventral small tuft; no ventral brush. Anal gills long, four, equal, rounded, narrow.

***Wyeomyia asullepta* Theob. (Pl. V, fig. 24).**

Head rounded, angled behind, antennæ small, cylindrical, without tuft. Abdominal hairs rather slight, diminishing posteriorly, skin

smooth. Comb of 13 obliquely erect, thorn-shaped scales in a straight row. Air tube three times as long as wide, conic; several two-haired tufts below; no pecten. Anal segment with dorsal plate with heavy chitinous basal band; dorsal tuft, lateral and subventral hairs; no ventral brush. Anal gills with the lower two sac-like, the upper two minute.

Sabethoides undosus Coq. (Pl. IV, fig. 16).

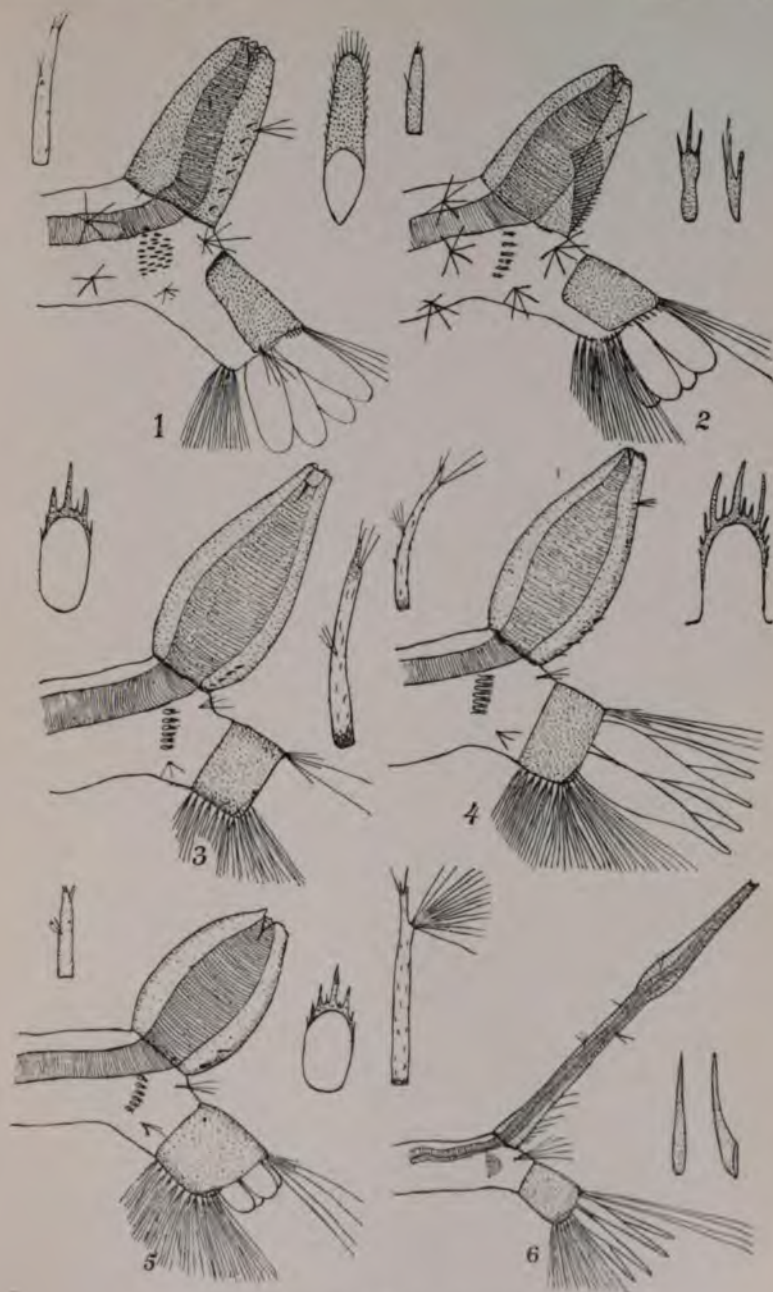
Head rounded, narrowed before, widest at posterior angles, a black bar on back of head just behind angle; antennæ short, not exceeding the mouth brush. Hairs moderate, diminishing posteriorly, the short hairs large stellate tufts very coarse and black. Pecten of six large remote thorn-shaped teeth in a line. Air tube flared at base, then straight and even, very long; a few fine hair tufts especially along the ventral edge; no pecten. Anal segment plated, with dorsal and subdorsal tufts on the plate; two subventral tufts joined by a chitinous band, all of long hairs. Anal gills four, rather long, tapered abruptly on distal half.

Trichoprosopon nivipes Theob. (Pl. IV, fig. 18).

Head rounded, broader than long; eye very small, rounded, black; antennæ very small, scarcely as long as the mouth brush. Body long, equal, the hairs moderate, multiple, diminishing posteriorly; eighth segment without a lateral comb but a single stout seta arising from a large tubercle. Air tube very small, about half as long as the width of the body, straightly tapered, twice as long as wide; no pecten; a stout tuft at middle and slight hairs on dorsal aspect. Anal segment short with a dorsal plate narrowed laterally, squarely terminated; dorsal hairs stout and long; a hair at lateral margin of plate; two subventral tufts joined by a curved chitinous band; no ventral brush. Anal gills four, large and swollen, bluntly rounded, sack-like, rather opaque, spotted.

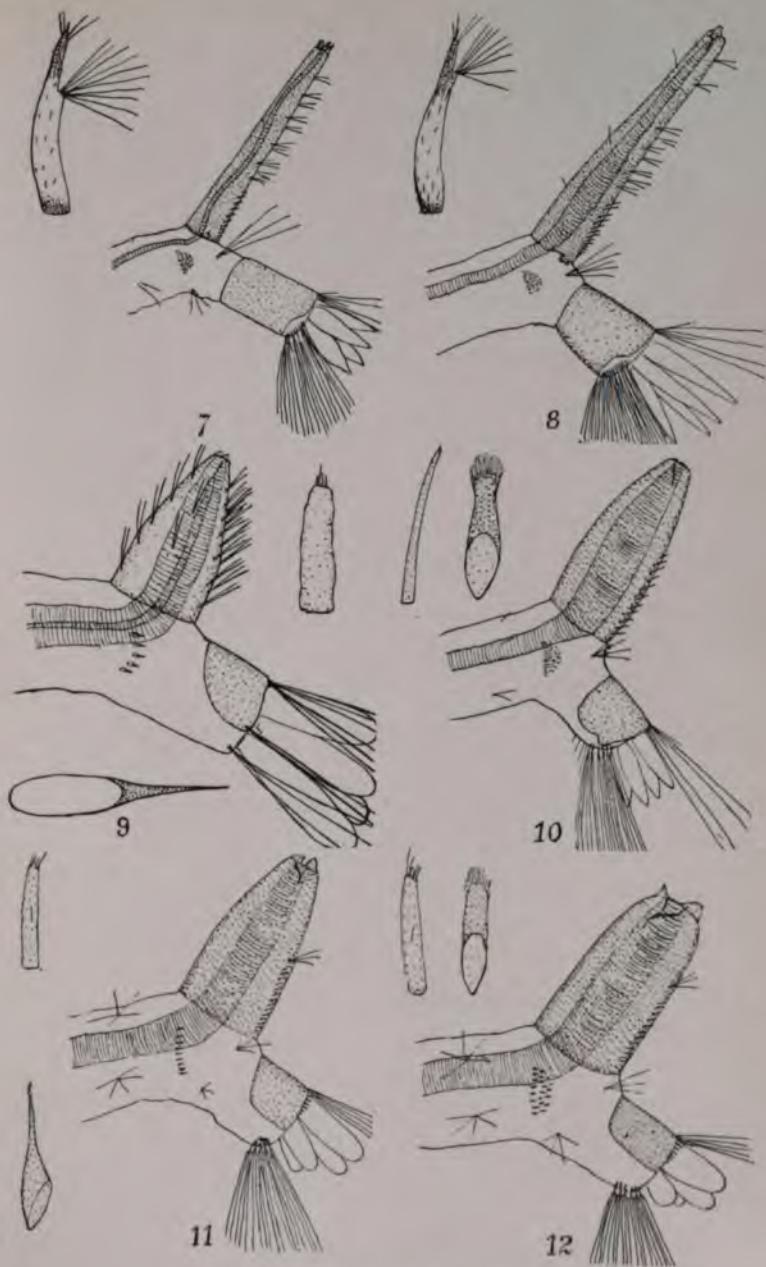
EXPLANATION OF PLATES.

- Fig. 1. *Aedes busckii* Coq.
 2. *Aedes mediovittata* Coq.
 3. *Grabhamia scholasticus* Theob.
 4. *Grabhamia infine* D. & K.
 5. *Grabhamia pygmaeus* Theob.
 6. *Culex daumasturus* D. & K.
 7. *Culex inhibitor* D. & K.
 8. *Culex lamentator* D. & K.
 9. *Wycomyia durhami* Theob.
 10. *Aedes laternaria* Coq.
 11. *Aedes philosophicus* D. & K.
 12. *Aedes cyaneus* Fab.



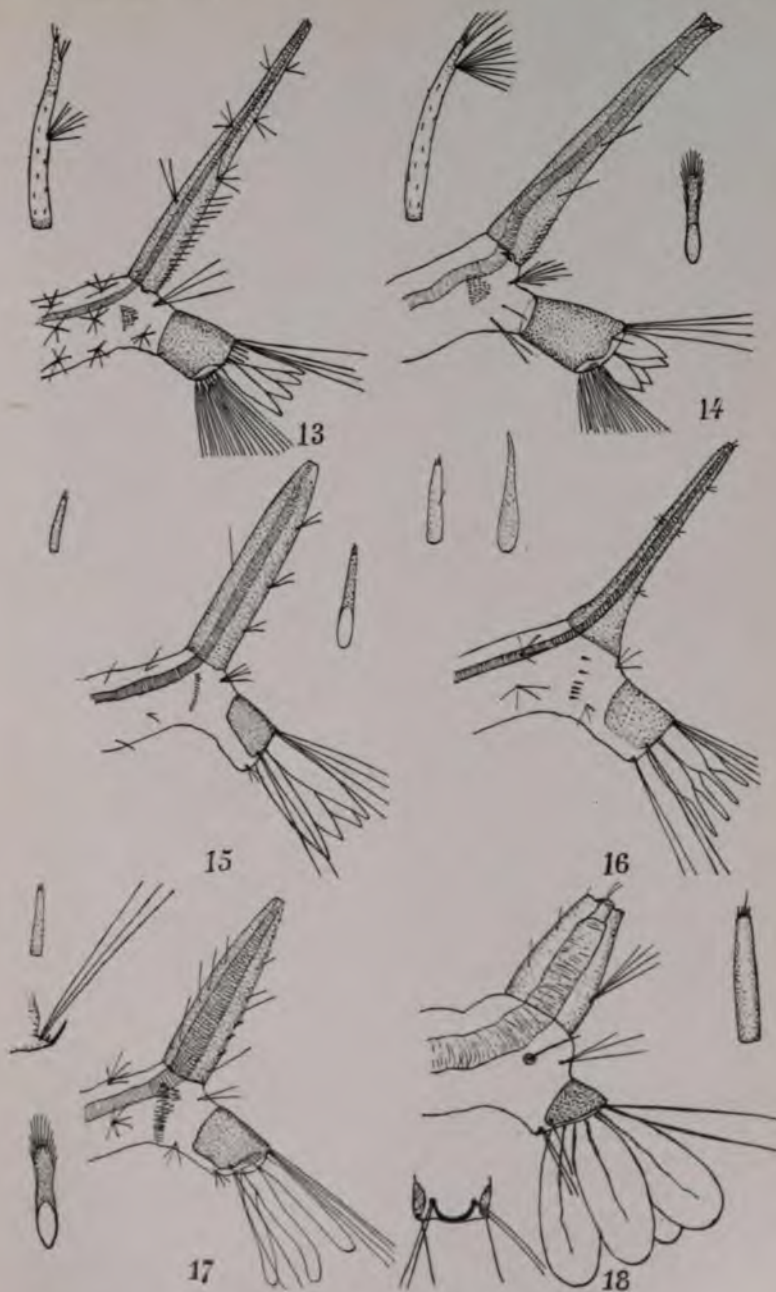
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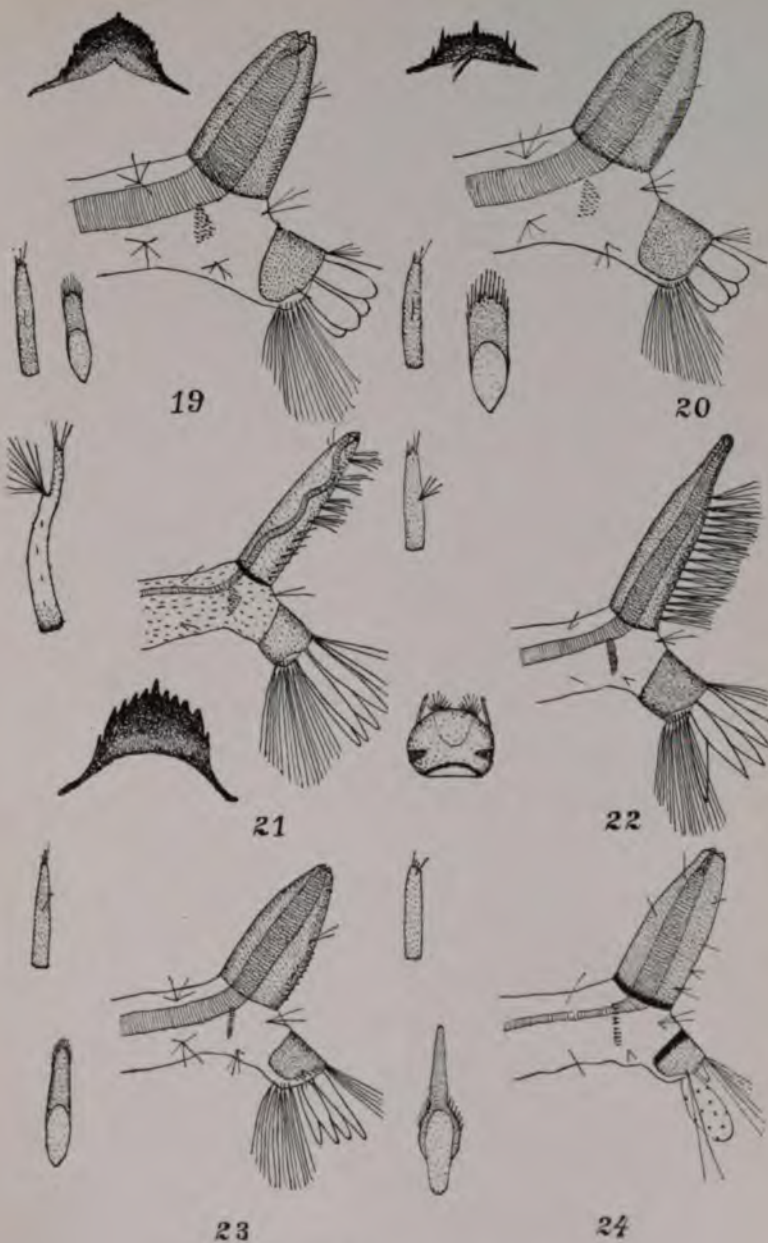
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13. *Culex bisulcatus* Coq.
 14. *Culex conservator* D. & K.
 15. *Wyeomyia grayii* Theob.
 16. *Sabethoides undosus* Coq.
 17. *Wyeomyia ulocoma* Theob.
 18. *Trichoprosopon nivipes* Theob.
 19. *Aedes insolita* Coq.
 20. *Aedes knabi* Coq.
 21. *Culex mutator* D. & K.
 22. *Mochlostyrax urichii* Coq.
 23. *Aedes albonotata* Coq.
 24. *Wyeomyia asullepta* Theob.
-

The following papers by members of the Society have been accepted by the publication committee:

**CLASSIFICATION OF THE FORAGING AND DRIVER
ANTS, OR FAMILY DORYLIDÆ, WITH A DE-
SCRIPTION OF THE GENUS
CTENOPYGA ASHM.**

By WILLIAM H. ASHMEAD, M.A., D.Sc.

In the Canadian Entomologist for November, 1905, pages 381 to 384, I gave a skeleton of a new arrangement of the families, subfamilies, tribes, and genera of the Ants, or the superfamily Formicoidea in which several new genera were indicated. Among these was the genus *Ctenopyga*, from Mexico, which I now describe and figure, after giving analytical tables for recognizing the three subfamilies, the tribes, and the genera falling in each, according to the three sexes, worker, female, and male, when known, taken from my forthcoming classification of the Ants, or the superfamily Formicoidea.

Family XLIII. DORYLIDÆ.

The ants belonging to this family are held together and easily separated from those of other families by habits and by peculiarities of structure, the females being nearly always wingless, the workers having the antennæ inserted much farther forward on the head, close to the anterior margin, and by the genitalia of the males which differ widely from those of other ants, the terminal ventral plate, or the hypopygium, being broad and deeply semicircularly emarginated, forked or bispined.

It is this character which induces me to place the *Acanthostichinæ* in this family rather than in the family *Poneridæ*, although otherwise, especially in the workers, they are apparently just as closely allied to that family, where Forel and Emery now place them.

The first species discovered, however, was a worker and that was originally placed by Frederick Smith, of the British Museum, in the Dorylid genus *Typhlopone* Westwood. Dr. Gustav Mayr made *Typhlopone serratula* Smith the type of his genus *Acanthostichus*, which is now known in all three sexes, the female having been described and figured recently by Professor Emery, who also at one time classified the genus with the subfamily *Dorylinæ*.

The three subfamilies may be recognized from the structural characters made use of in the following table:

TABLE OF SUBFAMILIES.

1. Workers	2
Females	5
Males	12
2. Abdominal petiole composed of only <i>one</i> joint	4
Abdominal petiole composed of <i>two</i> joints.....	3
3. Antennæ 9 to 10-jointed.....	Subfamily I. ECITONINÆ
4. Antennæ 9 to 12-jointed.	
Pygidium normal, the apical margin not armed with a row of fine teeth.....	Subfamily II. DORYLINÆ
Pygidium abnormal, the apical margin armed with a row of fine teeth.....	Subfamily III. ACANTHOSTICHINÆ
5. Wingless forms.....	6
Winged forms.....	11
6. Head <i>without</i> either eyes or ocelli.....	7
Head with the eyes present, represented by a single ocellus, at or near the lateral middle.....	8
7. Head <i>not</i> distinctly bilobed; thorax with only the pronotal suture present, the mesonotal suture absent....	Subfamily I. ECITONINÆ
Head distinctly bilobed; thorax with the pro- and meso-notal sutures distinct.....	Subfamily II. DORYLINÆ
8. Pygidium normal, unarmed.....	9
Pygidium abnormal, the apical margin armed with a row of minute teeth	10
9. Meso-metanotal suture absent, the meso- and meta-notum closely united, the pronotal suture indistinct....	Subfamily I. ECITONINÆ
Meso-metanotal suture distinct, the meso- and meta-notum separated, the pronotal suture distinct.....	Subfamily II. DORYLINÆ

10. Thorax with only the meta-notal suture present, indicated by a transverse row of punctures; head not bilobed,

Subfamily III. ACANTHOSTICHINÆ

11. Pygidium armed with a row of fine teeth along the apical margin; front wings with *three* cubital cells,

Subfamily III. ACANTHOSTICHINÆ

12. Submedian cell in front wings *shorter* than the median cell, the transverse median nervure uniting with the median vein *before* the basal nervure.....13

Submedian cell in front wings distinctly *longer* than the median cell, the transverse median nervure uniting with the median vein *beyond* the basal nervure

Femora neither flat nor compressed....Subfamily I. ECITONINÆ

Femora abnormally flat or compressed.Subfamily II. DORYLINÆ

13. Femora abnormally flat or compressed; mandibles more or less sickle-shaped or conical, without teeth or a masticatory edge,

Subfamily II. DORYLINÆ

Femora normal, neither flat nor compressed; mandibles more or less triangular, and with a broad masticatory edge,

Subfamily III. ACANTHOSTICHINÆ

Subfamily I. ECITONINÆ.

1893. 2me Tribu: Ecitonii Forel, Ann. Soc. ent. Belgique, xxx, p. 163.

1895. 2 Tribus: Ecitonii Emery, Zool. Jahrb. Syst., viii, p. 765.

This subfamily I have divided into two minor groups or tribes, as follows:

TABLE OF TRIBES.

- | | |
|--|--------------------|
| 1. Workers | 2 |
| Females | 3 |
| Males | 4 |
| 2. Mesonotal suture wanting or never distinctly defined. | |
| Antennæ 12-jointed; inner tibial spur pectinate. | Tribe I. Ecitonini |
| Antennæ 10 or 11-jointed; inner tibial spur apparently simple, | Tribe II. Ænictini |
| 3. Wingless; head not distinctly bilobed. | |
| Eyes represented by a single ocellus a little <i>behind</i> the lateral middle of the head; node of petiole transverse, concave medially and posteriorly, the upper hind angles prominent; antennæ 12-jointed. | Tribe I. Ecitonini |
| Eyes absent or represented by a single ocellus <i>before</i> the lateral middle of the head; node of petiole a little longer than wide; antennæ 10-jointed, or rarely 11-jointed.... | Tribe II. Ænictini |
| 4. Front wings with <i>three</i> cubital cells..... | Tribe I. Ecitonini |
| Front wings with <i>two</i> cubital cells..... | Tribe II. Ænictini |

3. Ocelli absent; femora clavate; metathorax posteriorly truncate and bounded by an elevated rim at apex; mandibles curved downward; claws simple *Ænictus* Shuckard
(Type, *Æ. ambiguus* Shuckard)
4. Eyes prominent, placed at the lateral middle of the head, the ocelli represented by a single ocellus anteriorly.....*Oöceræa* Roger
(Type, *O. fragosa* Roger)
5. Wingless; head oblong-quadrangular, much wider than the thorax; thorax more than thrice longer than wide, without sutures; abdominal petiole quadrangular, longer than wide; antennæ 10-jointed.
Ænictus Shuckard
6. Front wings with *two* cubital cells, the stigma distinct, the transverse median nervure interstitial with the basal nervure or nearly, the median and submedian cells equal or nearly; pygidium posteriorly rounded; antennæ tapering off at apex, the intermediate joints wider than long*Ænictus* Shuckard

Subfamily II. DORYLINÆ.

This subfamily reaches its greatest development in Africa where the genera and species are numerous, although a few extend into Asia.

It may not occur in America, as the two American genera placed here, namely *Typhlopone* Westwood and *Cheliomyrmex* Mayr are unknown to me in nature and are placed here from the description alone. I suspect that both may belong to the Ecitoninæ. *Sphinctomyrmex* Mayr is also another doubtful Doryline which I have not been able to see.

Two distinct tribes have been recognized from the males.

TABLE OF TRIBES.

Front wings with <i>three</i> cubital cells, the second receiving only one recurrent nervure	Tribe I. <i>Ænictogitonini</i>
Front wings with <i>two</i> cubital cells, the first receiving the single recurrent nervure	Tribe II. <i>Dorylini</i>

Tribe I. *ÆNICTOGITONINI*.

This tribe is based upon the genus *Ænictogiton* Emery, known only in the male sex, the type being *A. fossicans* Emery. The worker and female will probably resemble some of those in the tribe Dorylini.

Tribe II. *DORYLINI*.

Africa is evidently the original home of this tribe, where the genera and species are abundantly represented. Prof. C. Emery, the eminent Italian myrmecologist, in his paper "Die

^a Zool. Jahrb. Syst., VIII, 1895.

- Abdominal petiole wider than long, or at the most not longer than wide *Dorylus* Fabricius
(Type, *Vespa helvulus* Linné)
9. Mesonotal suture obsolete or very indistinct.....10
Mesonotal suture very distinct or indicated by a constriction.....13
10. Abdomen normal, not constricted between each segment.....11
Abdomen abnormal, constricted between each segment; pygidium impressed or forked; antennæ 11-jointed (rarely 12-jointed),
Sphinctomyrmex Mayr
(Type, *Typhlopone stoll*i Mayr)
11. Antennæ 11 or 12-jointed.....12
Antennæ 10-jointed.
Head very large, the clypeus prominent.....*Shuckardia* Emery
(Type, *Alaopone abeillei* André)
12. Antennæ 12-jointed, gradually thickened towards apex; head not much longer than wide; maxillary palpi 2-, labial palpi 3-jointed; mandibles curved, with a strong triangular tooth near base within*Cheliomyrmex* Mayr
(Type, *C. Nortoni* Mayr)
Antennæ 12-jointed; head about twice as long as wide,
Probolomyrmex Mayr
(Type, *P. filiformis* Mayr)
13. Antennæ 12-jointed, gradually thickened towards apex; clypeus very narrow, transverse; maxillary palpi 2-, labial palpi 3-jointed,
Cheliomyrmex Mayr
(Type, *C. nortoni* Mayr)
14. Head bilobed; petiole transverse, obtuse above and produced into acute angles behind.
Thorax trilobed15
Thorax *not* trilobed16
15. Thorax trilobed with a distinct constriction between the lobes, the metathoracic lobe the narrowest; mandibles long acute; abdomen terminating in a peculiar plate which has a deep, narrow, median emargination at apical half.....*Anomma* Shuckard
Thorax trilobed but without a distinct constriction between the lobes, although the lobes are distinctly separated or indicated by faint sutures above; hypopygium not narrow, broadly emarginate at apex*Dorylus* Fabricius
16. Thorax a parallelogram, a little more than twice as long as wide, with a slight lateral constriction at the middle, the lobes closely united, not indicated by sutures above; hypopygium narrow, the sides parallel, deeply forked at apex.....*Dichthadia* Gerstäcker
17. Front wings with *two* cubital cells, the stigma narrow, lanceolate. Abdominal petioles wider than long, convex anteriorly, but truncate or emarginate posteriorly; first two joints of flagellum nearly equal18

- Abdominal petiole quadrate or rounded; first two joints of flagellum unequal19
18. Mandibles about *four* times as long as wide at base; submedian cell shorter than the median*Anomma* Shuckard
- Mandibles much broader, at the most only three times as long as wide at base.
- Submedian cell *shorter* than the median.....*Dorylus* Fabricius
- Submedian cell *longer* than the median.....*Rhogmus* Shuckard
19. Mandibles broad, at the most not twice as long as wide at the base, 20
- Mandibles narrow, about *three* times as long as wide at base.
- Thorax with appressed pubescence above....*Typhlopone* Emery?
20. Thorax dorsally *with* an oblique, erect pubescence.
- Mandibles much narrowed towards apex and produced into a long point*Dichthadia* Gerstäcker
- Mandibles not especially narrowed towards apex..*Alaopone* Emery
- Thorax dorsally *without* an erect pubescence, but with only a *fine* quite appressed pubescence.....*Shuckardia* Emery

Subfamily III. ACANTHOSTICHINÆ.

1893. 2me Tribu: Cerapachysii Forel (partim), Ann. Soc. ent. Belgique, xxxvii, p. 162.
1895. 3 Tribus: Cerapachyi Emery (partim), Zool. Jahrb. Syst. viii, p. 765.
1901. 1 Tribu: Acanthostichii Emery, Bull. Soc. ent. Belgique, xlv, p. 34 (Poneridæ).

This subfamily is undoubtedly closely allied to the next family, or the Poneridæ; but on account of the male genitalia being similar to the dorylid type I prefer to retain it in this group.

Representatives are known in North America, *i. e.* Texas, Mexico, and Central America and in South America. The first specimen I had seen of this curious group, *Acanthostichus kirbyi* Emery, was kindly given to me by my friend, the eminent French hymenopterologist, Mr. Ernest André, of Gray, France. This has aided me very materially in working out the new genus characterized below:

TABLE OF GENERA.

1. Workers2
- Females3
- Males6
2. Mesonotal suture obsolete or very indistinct; head oblong, smooth, the sides nearly parallel; frontal carinæ with lobes that cover the

articulation of the antennæ, the latter 12-jointed; thorax flattened above, with some elongate punctures; abdominal petiole quadrate, with a number of irregular depressions above,

Acanthostichus Mayr

(Type, *Typhlopone serratula* Smith)

- Unknown (see ♀ and ♂).....*Ctenopyga* Ashmead
3. Wingless4
- Winged5
4. Head oblong, not bilobed, *without* ocelli, the eyes minute; thorax with the meso- and meta-notum not divided by a distinct suture, together a little wider than long; abdominal petiole wider than long, trapezoidal, subconvex above.....*Acanthostichus* Mayr
5. Front wings with *three* cubital cells, a distinct stigma, and with the marginal cell more or less open at apex; submedian cell shorter than the median; pygidium with the apical margin armed with a row of spines; head oblong, the eyes and ocelli present; claws simple*Ctenopyga* Ashmead
(Type, *C. townsendi* Ashmead)
6. Marginal cell open at apex; flagellum rather stout, subclavate, the joints after the first a little wider than long; disk of mesonotum posteriorly flattened, the parapsidal furrows not distinct,

Acanthostichus Mayr

Marginal cell usually closed at apex; flagellum subfiliform, the joints a little longer than wide; disk of mesonotum subconvex, the parapsidal furrows and the humeral furrows present,

Ctenopyga Ashmead

***Ctenopyga townsendi* n. sp. (fig. 4).**

♀.—Length 5 mm. Castaneous, the head piceous-black, smooth and shining, the eyes well developed, oval, faceted, placed slightly beyond the lateral middle, the scape of the antennæ and the legs rufo-testaceous, the flagellum clavate, brownish, becoming yellowish at apex, the club distinctly yellowish. The oblong head is slightly wider than the thorax and about twice as long as wide, the hind margin only slightly and broadly emarginate, ocelli small, arranged in a triangle; the face has a median grooved line anteriorly between the antennæ; the antennal scape is depressed, somewhat broadened, and reaches to the base of the eyes, while the flagellum is clavate, thickened towards apex, the funicle joints being wider than long; the mandibles are large, triangular, with a broad, sharp, but edentate masticatory edge, the edge bordered with a few punctures; the thorax is a little more than four times as long as wide, slightly narrowed posteriorly, the anterior margin rounded, the posterior margin sharply but slightly obliquely truncate, the pro-, meso-, and meta-notal sutures distinct, the mesonotum a little longer than the pronotum, the scutellum well differentiated, with a crenate furrow across the base, the metanotum obtrapezoidal; the mesosternal

suture is distinct. Wings clear hyaline, the stigma brown, the veins pale, the cells as in figure 4. The abdomen is longer than the head and thorax united, cylindrical and very similar to the worker in *Acanthostichus* Mayr, the petiole being longer than thick, with a tubercle beneath at base, the pygidium at apex hairy and armed with a row of comb-like teeth.

♂.—Length about 4 mm. Highly polished black; the mandibles, the scape and pedicel of the antennæ, and the legs, except knees, tips of front tibiæ and all tarsi which are more or less yellowish, rufous or

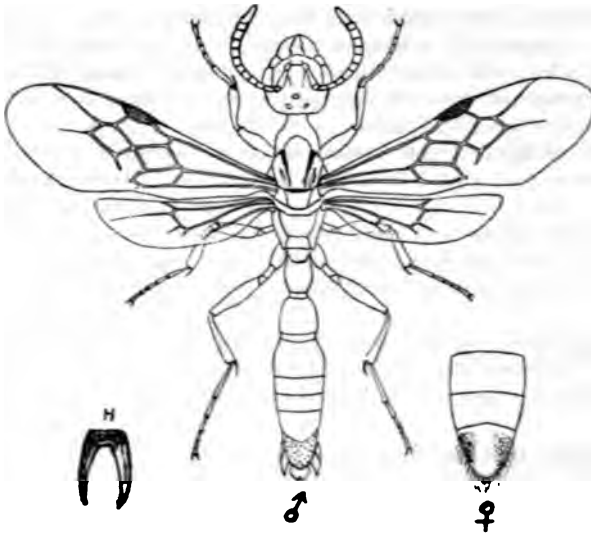


FIG. 4.—*Ctenopyga townsendi*: Male in center, tip of female abdomen at right, male hypopygium (H) at left.

rufo-piceous, the coxæ and femora dark; the flagellum is brownish yellow, subclavate, the last joint conical, a little longer than the two preceding joints united, the joints 1 to 6 longer than thick; wings much as in female. The parapsidal furrows are complete and the lateral lobes have the humeral furrow well developed; the hypopygium (fig. 5), which is strongly forked, and the genitalia are testaceous.

Type.—No. 7818, U. S. National Museum.

La Puerta, Mexico. One female and two male specimens taken May 6, 1895, by Professor C. H. Tyler Townsend.

NEW GENERIC NAMES.

Prof. T. D. A. Cockerell has kindly called my attention to the fact that three genera recently established by me are pre-

occupied in other departments of zoölogy and must be changed. I suggest the following new names:

Eiseniella n. n.

Eisenia Ashmead (not Malm, 1877), Mem. Carnegie Museum, I, No. 4, p. 232, 1904.

Elasmognathias n. n.

Elasmognathus Ashmead (not Gray, 1867), Proc. U. S. Nat. Mus., XXIX, No. 1424, p. 405, 1905.

Orthonotomyrmex n. n.

Orthonotus Ashmead (not Westwood, 1829), Can. Ent. xxxvii, No. 11, p. 384, November, 1905.

A NEW SPECIES OF THE CURCULIONID GENUS PARAPLINTHUS.

By W. F. FISKE.

Paraplinthus shermani n. sp.

Length 6.8 mm.; color very dark brown, more or less tinged with reddish; above sparsely clothed with elongate, yellowish scales, forming obscure irregular markings on the elytra. Prothorax with sides evenly rounded, convex above, median carina narrow, straight, sharply defined; surface above and on both sides with irregular, coarse, shining tubercles; punctures of elytral striæ sometimes separated with slightly elevated tubercles; interspaces each with one row of tubercles, more strongly developed on the alternate interspaces, which are also distinctly elevated.

Type.—No. 6370, U. S. National Museum.

Collected on Pisgah Ridge, Transylvania Co., N. C., at an elevation of between 5,000 and 6,000 feet. Three others were collected by the author at the same time. In the U. S. National Museum there is also a specimen from Grandfather Mountain, N. C., elevation above 4,000 feet, collected by J. M. Bentley, and received through Prof. Franklin Sherman, Jr., after whom the name *shermani* was proposed by Mr. Schwarz.

The species is easily distinguishable from *P. carinatus* Boh. by the sculpture of the prothorax and elytra. In *P. carinatus* the prothorax is depressed above, with coarse confluent punctures which are better defined on the sides. The striae punctures are more prominent and the even interspaces are not tuberculate. The occurrence of *Paraplinthus* in the Appalachian region is rather notable, as the genus has hitherto been

known in North America only from Alaska, and southward on the Pacific slope through British Columbia, Washington, and Oregon, to northern Idaho. According to Mr. Schwarz, its occurrence is paralleled by the distribution of other genera in Coleoptera, for instance, *Necrophilus* and *Pinodytes* of the Silphidæ. The eastern species of *Paraplinthus* was collected on the underside of freshly cut spruce chips lying on the ground.

THE SOUTH AMERICAN COCCIDÆ OF THE GENUS ERIOCOCCUS.

By T. D. A. COCKERELL.

It used to be supposed that *Eriococcus* was absent from South America, but in recent years a few species have been found in Brazil. Hempel cites three, but one of them, *E. armatus* Hempel, is an *Erium*. Mr. Schrottky has sent me a very ordinary-looking species from Villa Encarnacion, Paraguay (his No. 2508), which upon examination proves to be quite different from those described from Brazil. However, I do not see that it differs materially from *E. dubius* Ckll., described from specimens collected by Townsend in Mexico. The South American species may accordingly be tabulated as follows:

Female sac very long (11 mm.), of peculiar shape; third antennal joint much longer than fourth; on *Eugenia*, etc., Brazil.*perplexus* Hempel
Female sac small, less than 5 mm. long, quite ordinary.1

1. Third antennal joint much longer than fourth; legs smaller, anterior legs with femur plus trochanter 147 μ , tibia 78; on *Baccharis*, Brazil*brasiliensis* Ckll.

Third antennal joint little longer than fourth; joints measuring in μ , (20) 35-37, (3) 50, (4) 42-47, (5) 15-25, (6) 17-20, (7) 30-37; anterior legs with femur plus trochanter 235 μ , tibia 112-117, tarsus 105; middle legs, tibia 125, tarsus 107; hind legs, tibia 125, tarsus 120; width of anterior femur 72 μ ; claw 40 μ long, with a denticle on inner side; spines large and numerous, large ones over 60 μ long; mounted ♀ 2-2½ mm. long; antennæ very rarely 6-jointed by the union of 4 and 5; Paraguay.*dubius* Ckll. (var.?)

All three have 7-jointed antennæ. The antennæ of the Paraguayan insect are very like those of *E. quercus* Comst., and *E. tinsleyi* Ckll., but the legs are not as in these species.

NOTES ON COCCIDÆ.

By T. D. A. COCKERELL.

***Pseudococcus pandani* (Ckll.).**

This species was described some ten years ago, from specimens found in the Marquesas Islands, and has not been received from elsewhere. The following measurements, from the type, are in μ , and are necessary additions to the original rather too brief account. They are from a ♀ containing many embryos.

Antennal joints, (1) about 50, (2) 50, (3) 45, (4) 25, (5) 32, (6) 32, (7) 35, (8) 80. Anterior leg; coxa, 140; femur with trochanter, 270; tibia, 142; tarsus, 80. Hairs of anal ring, 125; longest hair of lateral caudal patches, about 140. The sides have small patches of spines.

Three distinct groups of *Pseudococcus* have quite similar types of antennæ: these are the groups of *P. citri*, of *P. neo-mexicanus*, and of *P. longispinus*. *P. pandani* is a member of the *citri* group, and is, perhaps, a race of *citri*. It is at present an open question what should be considered the limits of *P. citri*; certainly various forms, ostensibly belonging there, present important differences, but these may be due to individual or racial variation. It will be necessary to measure carefully numerous examples from each of several different localities and food-plants, and also to find out experimentally whether all forms can live equally well on all the plants cited for the species.

***Pseudococcus armatus* (Hempel), var. *a*.**

♀.—Ovisac pure white, long-oval, closely felted, about 3 mm. long; females greyish-black, enclosed in the ovisac and having a bunch of short cottony tassels (much like those of *P. citri*) at the caudal end; these may be seen in the opening in the posterior part of the ovisac. Boiled in caustic potash, the females are seen to be full of a blue-green pigment; a female full of eggs, mounted on slide, is 1650 μ long, 930 broad, while the eggs are long-oval, 300 μ long.

Skin with many round gland-orifices, not uniform in size; also some spearhead-like spines, 12 μ long, set in broad sockets; and a few small bristles. Anal ring ordinary, with six bristles. Caudal lobes quite prominent, mammæform; labium dimerous, short, about 100 μ long and 87 broad at base, regularly tapering to apex; legs and antennæ yellowish.

Measurements in μ : anterior leg; femur plus trochanter about 137. tibia 55, tarsus (exclusive of claw) 50; claw about 20, stout, nearly 10

broad at base, with no denticle on inner side. Hind femora plus trochanter 170–175, width of femur 47. Antennæ broken in the material examined, but joint 1 is 45 on long side, 25 on short; joint 2 is 30; the last joint is 62, and very bristly.

Larva. Antennæ and legs very stout; antennal joints (1) 22, on the longest side, (2) 15, (3) 12, with width 17, (4) 12, (5) 12, (6) 50. Hind leg: femur plus trochanter 82, tibia 45, tarsus 50.

Posadas, Argentine Republic, on *Baccharis genistelloides*, August 26, 1905 (Schrottky).

The ovisacs occur singly or a few together, but not bunched in masses. *Erium armatum* (Hempel) is also from *Baccharis*, and specimens from the type lot show that it has the same mammæform caudal lobes, the same spearhead-like spines, and the measurements of the legs and antennæ are not essentially different. I found the second antennal joint to measure 25, the last 62; the anterior leg with femur plus trochanter 142, tibia 65, tarsus 50. Hence, in spite of some differences indicated by Hempel's description, I do not like to call the Argentine insect a different species. I remove the species to *Pseudococcus*, not because it is at all typical of that genus, but because it is related as closely as possible to *P. filamentosus* (Ckll.) and *P. hymenocleæ* (Ckll.). Perhaps all three should be placed in *Erium*, or else this generic name should be abandoned. The resemblance to *filamentosus* is remarkably close—so close that if the insect had not been described by Hempel, I should have hesitated to propose a new specific name for it. The occurrence of the *filamentosus* type in the Argentine Republic is of much interest, and adds one more to the known cases of species of the southern part of North America being represented by those allied in southern South America.

***Phenacoccus helianthi* (Ckll.)**

Glenwood Springs, Colorado, on a composite, apparently *Machæranthera*. New to Colorado.

The original description is not as detailed as could be wished, so I give a new one from the Colorado material, which was collected by Mr. E. Bethel.

♀.—Very pale yellowish-grey; making a long white cottony ovisac, about $6\frac{1}{2}$ mm. long and 2 broad. Boiled, it turns red, but does not stain the liquid. Skin with many round glands, about 5μ diameter; labium about 152μ long and 112 broad, regularly tapering from base to apex; hairs of anal ring six, about 145μ long. Legs light yellowish, bristly; tibia with six bristles on outer row.

Measurements in μ : Anterior leg; femur plus trochanter, 300 (width

of femur, 90); tibia, 237 (width only 32); tarsus, 100; claw with an obtuse subapical denticle.

Antennal joints: (1) 50, (2) 80, (3) 67-70, (4) 45-50, (5) 50, (6) 40, (7) 37, (8) 32, (9) 60.

Larva (in ♀) elongate, 525 μ long, 225 wide. Antennæ 6-jointed, measuring (1) 25, (2) 27, (3) 25, (4) 27, (5) 27, (6) 62.

***Asterolecanium delicatum* (Green).**

Green's original description of this species is too brief for recognition, and as it may be some years before the full account is given in the "Coccidæ of Ceylon," I offer the following notes, taken from ♀ specimens received from Mr. Green:

Scale long-oval, light lemon-yellow, 1620 μ long, 870 broad (not counting fringe); fringe light lemon yellow, about 300 μ long.

***Eulecanium fletcheri* (Ckll.).**

Mr. E. Bethel has found this on juniper at Glenwood Springs, Col. It is new to the Rocky Mountain region.

***Kermes gillettei* Ckll.**

Ouray, Colorado, on oak (E. Bethel). This is the first record from the Pacific slope. The specimens are unusually small.

***Hemichionaspis theæ exercitata* (Green).**

This Ceylonese insect was first described as a species, and then reduced to the synonymy of *H. theæ*. Green has recently restored it, at least to varietal rank, but has given it a new name, *ceylonica*. Of course the original name must be maintained.

***Leucaspis* Targ., 1869.**

It has been alleged that this name is preoccupied. There is a *Leucaspis*, 1857, in fishes, but this may be considered to differ sufficiently, I think.

***Polyclona* Menge, 1856.**

This supposed genus, found in amber, must be removed from the Coccidæ; it is probably dipterous. *Ochryocoris* Menge, also from amber, is probably identical with *Orthezia*.

JANUARY 18, 1906.

The 201st regular meeting was held at the residence of Mr. J. D. Patten, 2212 R street, N. W., with the President, Mr.

Banks, in the chair. The following persons were present: Messrs. Ashmead, Barber, Banks, Burke, Busck, Caudell, Currie, Doolittle, Dyar, Gill, Girault, Heidemann, Hooker, Hopkins, Hunter, Knab, Patten, E. F. Phillips, Pierce, Piper, Quaintance, Schwarz, Titus, Uhler, Webb, and Webster, members, and Messrs. F. C. Bishopp, Douglas H. Clemons, Fred Johnson, J. D. Mitchell, A. C. Morgan, and E. R. Sasscer, visitors.

In the course of his report the Corresponding Secretary announced that Dr. L. O. Howard had recently been elected an honorary member of the Entomological Society of France and an honorary member of the Society of Economic Biologists, of England.

The Executive Committee reported that Dr. Wm. H. Ashmead had been nominated by them to represent the Entomological Society as a Vice-President of the Washington Academy of Sciences.

The Publication Committee reported that at their meeting of December 8, 1905, they had voted to continue the quarterly publication of the PROCEEDINGS OF THE ENTOMOLOGICAL SOCIETY OF WASHINGTON. By motion of the Society the report of the Committee was adopted.

The following new members were elected: Active, Messrs. J. H. Beattie, I. J. Condit, J. G. Sanders, and E. R. Sasscer, of the Bureau of Entomology, U. S. Department of Agriculture; corresponding, Messrs. F. C. Bishopp, Fred Johnson, A. C. Morgan, and C. E. Sanborn, of the Bureau of Entomology, U. S. Department of Agriculture, Miss Ella Frances Hall, of Amherst, Mass., and Mr. J. R. de la Torre Bueno, of 25 Broad street, New York, N. Y.

Mr. Banks then read his annual address as president for the year 1905, as follows:

ANNUAL ADDRESS OF THE PRESIDENT.

A PLEA FOR THE GENUS.

By NATHAN BANKS.

HISTORY.

There has been, in recent years, a strong tendency, with many entomologists, to divide old genera. This tendency has been more exploited in some orders than in others, but in nearly all groups of insects there are now many genera entirely strange to any but the specialist. Indeed, in the large orders it is impossible for one devoting himself to an entire order to become familiar with the ever-increasing flood of new genera appearing in hundreds of periodicals and journals. Almost overwhelming as it is to the specialist, is it strange that the general entomologist, the economic entomologist, and the collector of insects consider it an evil, second only to the nomenclature craze?

This multiplication of genera is due to a modification of the concept of a genus. With the early writers on entomology the genus was a very broad group, and of variable rank according to the author. Latreille, the father of modern entomology, in his first work, the "Précis," saw the necessity of fixing genera more definitely, and did so by elucidating their characters. In a few years, he, with others, assigned to genera certain species as examples or types.

There thus arose two views as to the basis of a genus. First, that it was an assemblage of species exhibiting certain peculiar characters, and second, that it was a certain type-species and forms congeneric therewith. This idea of the genotype, as an incarnation of the genus, has gathered many adherents who consider that any peculiarity of the type-species may be made the distinguishing character of the genus. With them a genus is not fixed so long as it contains two species; it may yet be divided. They care nothing for the characters of a genus, but rest all on the genotype. Indeed, genera are frequently formed on a species without the mention of any distinguishing

characters, a most ridiculous process. Some authors write the description of a new genus and species in one, and kindly suggest to the reader that "the characters of the genus may be gleaned from the above description." Anyone who attempts this gleaning process will find the field full of stones and weeds.

The other view, that a genus was definable by certain characters, held sway over systematists for at least the first half of the last century. Their idea was that when the characters of a genus were once fully given, that genus was fixed for all time. They commonly accepted the idea of a type as a species exhibiting all the characters of the genus in their full development. In fact, some of these authors cited two or more species as types of the genus. A species differing in some peculiarity was held none the less truly as belonging to the genus; or with others it might be separated in a section or subgenus. And here let me say that a subgenus is just as logical, just as natural, as a subfamily. Of course there was more or less deviation, but these were the predominant methods. With the increasing importance assigned to the genotype, there come new possibilities.

SPECIES AND GENERA ALIKE UNNATURAL.

In nature species are distinguished by all manner and degree of separation. One series of species may be separated only by differences in the genitalia of the male sex. Another series of forms may be separated not only by genitalic differences, but by color, by secondary sexual characters, by vestiture, by sculpture, by structural details, and by geographic range. One series may show species after species with slight variation; another series may display subspecies, races, aberrations, and sports in endless variety. In one case the species seem to be final, natural entities. By the other series one sees species in the course of development, their limits faint or inconstant, their characters too uncertain for language—species such as appear distinct to the eye, yet incapable of description. I know many have an idea that species are more definite than genera. As well say that the leaf is more definite than the twig, or the

twig more definite than the branch. Species, genera, families, are all parts of one great growth—a growth that still is growing, faster here, slower there.

In fact, there is all manner and degree of isolation and relation among species, some constant, some variable. The individual is the only natural unit.

Genera are broader views of species, clusters of leaves or twigs. Based on unnatural species they are of course unnatural. In attempting to place the restless, developing mass of insect life into the clothing of classification, sometimes the family will fit too tightly or the genus too loosely, and species here are not coequal to species there. As we discern these misfits it is natural that we try to adjust them.

RESULTS OF GENOTYPE METHOD.

It is evident that the more we study a species the more points we find wherein it differs from its allies. And by fixing our attention upon one species as an embodiment of the genus we narrow our ideas of the genus the more we examine the species. In our ardor to express these newly discovered differences we create new genera. Thus the logical outcome of such a process is that the genera become smaller and smaller, until the genus is equal to the species, and we could conveniently abolish genera. By applying to the subfamily and family in turn this gradual restrictive process we could abolish these terms also, and in time have nothing but species.

Just as on a tree there are scarcely two twigs of exactly the same size and shape, so there are scarcely two insects which are separable from all others by the same sum total of differences; so that the term species may be also gradually restricted until we reach the individual. Thus classification would work its own destruction.

Resting our ideas of the genus upon one species as the incarnation of the genus means that we must continually modify the generic characters, and continually narrow the limits of the genus. No insect is as yet thoroughly known. Each new student may read from the genotype new characters as generic. Considering the genus as based on a type-species will result—

is resulting to-day—in generic names destitute of significance, and subject to continual revision.

What do we gain by elevating each section of a genus into a separate genus? We gain nothing but confusion. We are no nearer a natural arrangement than before. Why must we make a new genus every time we discover a new peculiarity of a species? One examines the species of *Papilio* for days and days; result: "Why, *ajax* and *sinon* are not like the others at all, they have fine characters; they are *Iphiclides ajax* and *Iphiclides sinon*." Soon will another come along, and looking long and carefully on *ajax* and *sinon* declare: "Why, *sinon* is not an *Iphiclides*; it differs in so and so, it has fine characters, it is a new genus." Have we not seen it, and heard it over and over again!

I am not opposed to new genera. There are plenty of them awaiting discovery. But that is not the point. It is the splitting up of genera previously well defined, and the elevation of each section into a genus which, in many cases, is not as well defined as the old genus—all because the type-species is enlarged to generic proportions.

FIXED GENERA HAVE ARTIFICIAL CHARACTERS.

It is evident, therefore, that if we desire to have a fixed classification, its categories must rest on some definite, and therefore artificial, basis. We cannot continually shift the scope of our terms if we wish them to mean anything. We must give up the idea that the genus exists in nature. We must accept the genus as an artificial group, fitting more or less closely to minor breaks in the chain of life. Since the genus must be artificial, why not make it fixed and constant? Let the genus, like the family, occupy its present position in the scheme of classification, making sections under it as discoveries demand recognition. Of course there are many groups in which the genera have never been studied thoroughly, nor their characters well defined. Let us study such groups with the idea of basing the genera on structures, and not on species. Then they will have a permanent meaning, and a genus that means something is useful in a thousand ways.

If I say an insect belongs to the genus *Cicindela*, anyone who has ever collected insects knows what I mean ; but let the genus be divided, and sub-divided again and again, and *Cicindela* will mean nothing, except a type-species. Emphasizing the genotype means splitting genera ; emphasizing the generic characters means better-defined genera. But what characters are of generic value? No one man can answer with authority, yet we may consider a few points.

CRITERIA OF SPECIES.

First, what are the structures that should define species? The nearest we can come to the criterion of a species is its capability of interbreeding. Therefore the structure of the genital organs, or such secondary characters as are associated with them, must be the best specific characters. This includes, of course, all recognition marks or structures. No one, I think, studying insects to-day, can long resist the conclusion that sexual characters, although often more or less variable, and at times but slightly developed, are the fundamental characters of species. This vital difference in genitalia may find expression in more visible signs, recognition marks, index characters, by which the insect may know its mate. These are of many sorts, such as punctuation, color, sculpture, etc. With these necessary differences there may go accidental differences, which, although not essential, may aid in the separation of species. For example, in one fly a wing-cell may be longer than in a closely allied species. This character cannot be essential ; there must be accompanying it differences in genitalia or recognition marks, or some point of vital interest to the fly. These accidental specific characters may be of much use in the tabulation of species, but we must not lose sight of their intrinsically slight value.

WHAT CHARACTERS ARE OF GENERIC VALUE?

Genera should not be based on the characters used in the separation of species, no matter how widespread or constant they may be for groups. Although we expect that the species of a genus shall have a certain uniformity in genitalia and

recognition marks, differences in these points are properly of specific value. The genus, if it is to have a meaning different from species, must have a different basis. Neither should the characters of species be grouped for the purpose of making genera; the grouping of specific characters simply indicates groups of species. It introduces no new idea to warrant the new name, genus. Basing the genus on the characters of species means reducing the genus in rank, and multiplying the genera. Never yet did an author, basing genera on the characters of species, fail to create a lot of new genera.

Again, genera should not be based, as a rule, on a single structural point, nor on two or more related points, such as long wings and elongate cells. Rather should we seek for two or more disassociated characters for the foundation of a genus.

It is almost unnecessary to state that habits or coloration should not be the distinguishing characters of a genus.

The presence or absence of a structure is of more value than the size or development of a common character.

A character that has not been restricted to close limits within the family is not of much use in the separation of genera in that family.

An extreme of a variable character should not distinguish a genus. For example, if a cell in one genus of a family is wide open, and more or less completely closed in various other genera, its complete closure or even stylation ought not to be the basis of a genus.

Striking characters, noticeable at a glance, are rarely of generic value; but minute points, especially when associated with some habit, are of great use.

Differences in the mouth-parts, in the legs and wings, are preeminently of generic importance. The antennæ and head furnish also good generic structures; the rest of the body is much less valuable in these respects. We should consider the value of a character to the insect; whether it is related to the method of life. For example, a striking difference in shape of the ovipositor indicates that the insect has a different method or place of living from its allies, and we naturally expect to find that such a form represents a genus, definable also by other structures.

NEED OF REVISION.

Daily in our work we come across genera which we well know are not good genera. Why then accept them? An author will tabulate the species of two or more genera in one synoptic key; it being evident that the characters which distinguish the genera are of less value, or are less constant, than the characters that separate the species. Such genera are worthless. They mean nothing. They are of no value to science.

There is need, sore need, of generic revision in nearly all groups of insects. If we look to the genotype as the only source of generic characters, the work will have to be done over again, and still again, and again. For each new student will look closer and more sharply than the last. Let us fasten the genus at a definite place in the scheme of classification by giving to it constant and peculiar characters, and the name will hold and mean something. The systematic entomologist can do no better work than in placing genera on the sure foundation of definite characters.

Finally, let us remember: That classification is unnatural; that a genus based on a type-species can be interpreted to suit each student; that if we desire the genus to have and to carry the same meaning at all times it must be based on definite structures; and that dividing genera brings us no nearer to a natural arrangement, while it is often a hindrance to our science.

Doctor Hopkins complimented Mr. Banks on his address and said that his experience led him to agree with the latter that the splitting up of genera without a detailed study to determine the real generic characters as distinguished from specific characters is not contributing to advancement but rather to the opposite. He thought that it was far better to classify the large genera into primary and secondary divisions and sections under one name, according to interpreted natural affinities, rather than to introduce new names for genera and sub-genera established on characters of indefinite separation from established genera.

Doctor Gill stated that there is no hard and fast line which

can be drawn in the recognition and definition of genera. The genus is as natural an assemblage as a species, or even more so. He believed that ultimately there will be substantial agreement as to what characters are of generic value. The genera of Linnæus, he stated, were in many cases very unnatural.

Mr. Caudell remarked that in his studies of the Orthoptera he had often been impressed by a fact pointed out by Mr. Banks in his address, namely, that obvious and striking peculiarities are often of no generic value. Doctor Gill said that among birds color or pattern is more or less uniform throughout the species of certain genera and is therefore a useful character in such cases. He called attention to the good work done by Leach in the erection of genera and of Kirby in creating families, in entomology. Kirby was the first to use the termination -idæ for families in entomology.

Doctor Ashmead believed that there are genera which may rightly be called natural. He agreed with Mr. Banks that minute or inconspicuous characters are often more stable and of more value in defining genera than conspicuous or striking ones. He believed, however, that there are good generic characters in the genitalia. The arrangement of the spiracles, also, furnishes a good character. He thought that in very many cases the subdivision of existing genera is not only justifiable but desirable and necessary, and that much of the work now being done in erecting new genera is entirely sound.

Doctor asked the question, "What is a natural group?" The farther removed from a species a group is, the more difficult is its definition and limitation. For instance, the Coleoptera with the Stylopidae removed form a natural group; with them, the order is unnatural. Mr. Banks stated that there are no good characters which serve to define all the members of any of the larger orders of insects, nor to separate and distinguish them from members of other related orders. Doctor Gill directed attention to the fact that parasitism obscures natural group affinities, and that in classifying these forms recourse should be had to embryological studies. Doctor Hop-

• stated that a knowledge of the life history and habits of
of a genus contributes greatly to a correct interpreta-

tion of structural characters and to the classification of the species into natural groups. Doctor Gill then spoke of the danger there is in relying too much on similarity of habits or mode of life as a guide to classification. With proper limitations, however, ecology may furnish useful hints.

Mr. Busck thought it a rather gloomy view to take, that the systematists should be getting away from the natural groups, and he contended that although our present arrangement of insects may not be perfect it is surely much nearer perfection than it was in the days of the old authors. Doctor Dyar said that a natural classification would be one in accord with phylogeny, while an unnatural one would not.

—The following paper, read by title, has been accepted by the publication committee:

**THE CRYPTOCERATE HEMIPTERA OF AMERICA IN THE
WRITINGS OF PROFESSOR ARNOLD
L. MONTANDON.**

By J. R. DE LA TORRE BUENO.

Prof. Arnold L. Montandon, of Bucarest, Rumania, has devoted a great deal of attention in recent years to the cryptocerate Hemiptera and has published a large number of notes and papers on them, all of great value to students of the water-bugs. American hemipterists will find these of great interest, for not only has Professor Montandon published several monographs of peculiarly American groups, but he has also described a number of new species indigenous to the Western Hemisphere, and corrected many synonymies, reviving forgotten species and establishing the distinctive characters of many obscure forms. In addition, he has paid great attention to the Pentatomidæ, especially the Scutellerinæ.

In the following bibliography are listed all the papers, so far as can be learned, which Professor Montandon has published to date on the American water-bugs; but papers upon other groups of Hemiptera, or those which deal only with Old World Cryptocerata, are omitted. It is the aim of the writer to place in concrete form before American hemipterists the importance to us of the work done by this European savant; hence the form of this list. No less important to us is an acquaintance with those forms found in Spanish America and

the Antillean islands, for many species described from the Tropics find their way north and south to more temperate regions—a fact which the tremendous range of certain water-bugs has made familiar to all students.

In the bibliography (Part I) each title will be numbered, and, to make reference easy, these numbers will be given in the systematic list (Part II) in parentheses after the names of species, genera, and higher groups. In the systematic list, also, new species will be indicated by black type, valid species will be in Roman type, and synonyms and manuscript names will be printed in italics. Valid genera will be in black capitals, and synonyms in italics. The generic names in parentheses, following any species, indicate the genus under which that particular species is mentioned by Montandon. The localities given are only those mentioned by him, and where they are omitted it is because he mentions none.

PART I. BIBLIOGRAPHY.

- (1) 1895. Hémiptères nouveaux de la section des Hydrocorises Latr. < Ann. Soc. Ent. Belg., T. xxxix, pp. 471–477.
- (2) 1895 (Dec. 12). Hémiptères Hétéroptères. Première liste et descriptions d'espèces nouvelles. (Viaggio del Dott. A. Borelli nella Repubblica Argentina e nel Paraguay.) < Boll. Mus. Zool. ed. Anat. Comp. R. Univ. Torino, Vol. x, No. 219, pp. 1–10 (of separate).
- (3) 1896. Hémiptères Hétéroptères exotiques. Notes et descriptions. II. Fam. Belostomidæ. < Ann. Soc. Ent. Belg., T. xl, pp. 508–520.

This paper is very important, as it contains a full discussion of the synonymy of *Benacus* and also treats of the American forms of *Belostoma* auct. (now *Amorgius*). It is extremely useful for the separation of our native species.

- (4) 1897. Hemiptera Cryptocerata. Fam. Naucoridæ, Sous-fam. Cryptocricinæ. < Verh. zool.-bot. Ges. Wien, Jahrg. 1897, pp. 1–19 (of separate).

Another important paper in which two genera are established and a number of new species described (especially in the North American genus *Ambrysus*). It contains also a general discussion of older species, with tables for the separation of all to that date in the genus *Ambrysus*.

- (5) 1897. Hemiptera Cryptocerata. Fam. Naucoridæ. Sous-fam. Laccocorinæ. < Verh. zool.-bot. Ges. Wien, Jahrg. 1897, pp. 1–20 (of separate).

The one species mentioned, *Heleocoris spinipes* Mont., is remarkable as being the only American representative of the subfamily Laccocorinæ Montandon.

- (6) 1897 (June 11). Hemiptera Cryptocerata. Revision de la Sous-fam. "Limnocatorinæ." < Boll. Mus. Zool. ed Anat. Comp. R. Univ. Torino, Vol. XII, No. 297, pp. 1-8 (of separate).
- (7) 1898. Hemiptera Cryptocerata. Fam. Naucoridae. Sous-fam. Limnocatorinæ. < Verh. zool.-bot. Ges. Wien, Jahrg. 1898, pp. 1-13 (of separate).

This and the preceding paper are absolutely indispensable for the study of the subfamily Limnocatorinæ, so many members of which are North American. They are the most recent and complete essays on the groups treated. The second paper contains a complete table for the separation of all the species described to the date of issue.

- (8) 1897. Hémiptères nouveaux des collections du Muséum de Paris. < Bull. Mus. Hist. Nat., 1897, No. 4, pp. 124-130 (separate, pp. 1-7).

Describes one new *Cryphocriscus* and four *Ambrysus* from South America, with references to allied species of the latter.

- (9) 1898. Hémiptères Hétéroptères. Une nouvelle forme dans le genre *Ranatra*. Description d'une espèce nouvelle. < Bull. Soc. Sci. Buc., Rumania, An. VII, No. 1, pp. 1-5 (this pagination is of the separate, the only form in which I have seen this publication).

This is the first of a series of papers published in the "Bulletin de la Société des Sciences," of Bucarest, a publication inaccessible to the majority of American workers and known to me only by separates, all separately paged. In this paper under discussion a new genus of *Nepidae*, near *Ranatra*, is established.

- (10) 1898. Hemiptera Cryptocerata. Notes et descriptions d'espèces nouvelles. < Bull. Soc. Sci. Buc., An. VII, No. 3-4, pp. 1-10.

Contains a discussion of the genus *Pelocoris* and describes new species in it, as well as one in *Ambrysus*.

- (10A) 1898. Hemiptera Cryptocerata. Notes et descriptions d'espèces nouvelles. < Bull. Soc. Sci. Buc., An. VII, No. 5, pp. 1-5 (of separate).

- (11) 1898. Hemiptera Cryptocerata. Notes et descriptions d'espèces nouvelles. < Bull. Soc. Sci. Buc., An. VII, No. 6, pp. 1-9 (of separate).

Descriptions of new species and a discussion of others of the exotic genus *Laccotrephes* in *Nepidæ*. Of interest because it also discusses our *Nepa apiculata* Uhler, and distinguishes it from the European *N. cinerea* L.

- (12) 1898. Hémiptères Hétéroptères nouveaux des collections du Museum de Paris. < Bull. Mus. Hist. Nat., No. 2, pp. 72-75.

Describes a new species of *Pelagonus* Latr. et auct. olim (now *Ochterus* Latr.) and discusses some of the other American forms of the genus.

- (13) 1899. Hemiptera Cryptocerata. S. fam. Mononychinae. Notes et descriptions d'espèces nouvelles. 1-ère Partie. < Bull. Soc. Sci. Buc., An. VIII, No. 4-5, pp. 1-18 (of separate).

This important paper is practically a revision of the genus *Mononyx* with notes on the other genera, tables for the separation of genera in the subfamily and species in the genus. The second part deals with the exotic genera *Matinus* and *Peltopterus*, one only of the former having been recently described from America, in one of the papers under discussion.

- (14) 1899. Hémiptères Hétéroptères. Trois espèces nouvelles du genre *Zaitha* Am. et Serv., des collections du Muséum de Paris. < Bull. Mus. Hist. Nat., No. 4, pp. 170-173 (pp. 1-4 of separate).

- (15) 1900. Notes sur quelques genres de la Fam. Belostomatidæ. < Bull. Soc. Sci. Buc., An. IX, No. 2-3, pp. 1-12 (of separate).

Contains a discussion of the generic synonymy of certain of the Belostomatidæ, including *Zaitha* A. & S., and *Perthostoma* Leidy, both of which are shown to be strict synonyms of *Belostoma* Latr.; and proposes to throw *Serphus* Stål, *Pedinocoris* Mayr, and *Deinostoma* Kirkaldy into the one genus *Abedus* Stål.

- (16) 1900. Hemiptera Cryptocerata. Description d'une nouvelle espèce du genre *Amorgius*. < Bull. Soc. Sci. Buc., An. IX, No. 5, pp. 1-4 (of separate).

- (17) 1900 (July 4). Notes sur quelques Hémiptères Hétéroptères et descriptions d'espèces nouvelles des collections du Musée Civique de Gênes. < An. Mus. Civ. Stor. Nat. Genova, Serie 2^a, Vol. xx (xl), pp. 531-541.

Treats principally of Pentatomidæ, but describes *Belostoma gestroi* on page 537.

- (18) 1900. Hémiptères exotiques ou peu connus des collections du Musée National Hongroise. < Természtrajzi Füzetek, Vol. xxxii, pp. 414-422.

Describes a new American Limnocoris.

- (19) 1903. Hémiptères aquatiques. Notes synonymiques et géographiques, descriptions d'espèces nouvelles. < Bull. Soc. Sci. Buc., An. xii, No. 1-2, pp. 97-121.

Describes new species in Nepidæ and discusses others in the family, including *Nepa apiculata* Uhler, and goes more at length into synonymy of the belostomatid genera and species. Very necessary for nomenclature of the latter family.

- (20) 1903. Deux nouvelles espèces du genre *Belostoma* Latr. (= *Zaitha* Am. et Serv. et auct.) des collections du Muséum de Paris. < Bull. Mus. Hist. Nat., No. 1, pp. 21-23 (1-3 of separate).

- (21) 1905. Trois nouvelles espèces d'Hémiptères Cryptocerates des collections du Musée National Hongroise. < Ann. Mus. Nat. Hung., Vol. iii, pp. 403-406.

Describes three extremely interesting forms from South America, one being a species of the genus *Matinus* Stål, heretofore known only from Australia.

- (22) 1905. Espèces nouvelles ou peu connus du genre *Ranatra*. < Bull. Soc. Sci. Buc., An. xiv, No. 3-4, pp. 389-398.

This list of papers, as finally worked out, with an index of families, subfamilies, genera, and species added, becomes practically a preliminary check list of these families of Cryptocerata for America, and will for this reason be useful to workers in this section of the Hemiptera.

PART II. SYSTEMATIC LIST OF SPECIES, GENERA, AND HIGHER GROUPS.

Family OCHTERIDÆ Kirkaldy.

Genus OCHTERUS Latreille.

Pelogonus Latreille, olim (12).

- O. americanus Uhler (*Pelogonus*) (12).
- O. perbosci(i) Guérin (*Pelogonus*) (12).
- Campeche (Mexico) (12).
- O. splendidulus Montandon (*Pelogonus*) (12).
- Nanegal, Ecuador (12).
- O. victor Bolivar (*Pelogonus*) (12).
- Pichincha, Ecuador (12).

Family NERTHRIDÆ Kirkaldy.

Galgulidæ, olim.

Gelastocoridæ, olim.

Subfamily NERTHRINÆ Kirkaldy.

Mononychina auct. (13) + *Gelastocorina* Kirkaldy.

Genus MONONYX Laporte (13).

Phintius Stål (13).

- M. amplicollis Stål (13).
- Nueva Granada (now Colombia); Venezuela; Colombia; Costa Rica (13).
- M. badius Herrich-Schaeffer (13) (= fuscipes Guérin) (13).
- M. bipunctatus Stål (13) (= nepæformis Fabricius) (13).
- M. fuscipes Guérin (13).
- badius Herrich-Schaeffer (13).
- obscurus Stål (13).
- Mexico to Colombia; Costa Rica (13).
- M. fuscoconspersus Stål (13) (= raptorius Fabricius) (13).
- M. latus Montandon (13).
- Nanegal, Ecuador; Nueva Granada (now Colombia) (13).
- M. nepæformis Fabricius (2) (13).
- raptorius Burmeister, Amyot and Serville, Herrich-Schaeffer (13).
- bipunctatus Stål (13).
- San Pablo, Argentine Republic (2); Guianas; Brazil; Argentine Republic (13).

- M. obscurus* Stål (13) (= *fuscipes* Guérin) (13).
M. parvulus Signoret (13).
 Chile (13).
M. peruvianus Montandon (21).
 Callanga, Peru (21).
M. raninus Herrich-Schaeffer (13).
 La Guayra (Venezuela); Rosario, Argentine Republic;
 Goyaz (Brazil); Paraguay (13).
M. raptorius Burmeister, Amyot and Serville, Herrich-Schaeffer (13) (= *nepæformis* Fabricius) (13).
M. raptorius Fabricius (2) (13).
fuscocoarsus Stål (13).
 Resistencia, Argentine Republic; Rio Apa (Paraguay)
 (2); Guianas; Brazil (13).

Genus MATINUS Stål (13) (21).

- M. americanus*** Montandon (21).
 Espirito Santo, Brazil (21).

Genus NERTHRA Say (13).

- N. stygica* Say (13).
 Georgia (13).

Family NAUCORIDÆ auct. (4) (7) (8) (10).

Subfamily NAUCORINÆ Kirkaldy.

- Limnocorinae* Montandon (6) (7) + *Laccocorinae* Montandon (5)
 + *Naucorinae* Montandon (8).

Genus LIMNOCORIS Stål (6) (7).

Borborocoris Stål (6) (7).

- L. bergrothi*** Montandon (7).
 Venezuela (7).
L. borellii Montandon (6) (18).
borelli Montandon (7).
 Bolivia (6).
L. bouvieri Montandon (7).
 Bogotá (Colombia) (7).
L. dubiosus Montandon (7).
 Chile; La Guayra (Venezuela); Nueva Granada (now
 Colombia) (7).
L. horváthi Montandon (18).
 Callanga, Peru (18).

- L. inornatus** Montandon (7).
Guatemala (7).
- L. insignis** Stål (6) (7).
Brazil (6).
- L. maculiceps** Montandon (7).
Matto Grosso (Brazil) (7).
- L. obscurus** Montandon (7).
Abejoral, Colombia (7).
- L. ochraceus** Montandon (7).
Colombia; La Guayra (Venezuela); Nueva Granada (now Colombia) (7).
- L. ovatulus** Montandon (6) (7).
Salta, Argentine Republic (6).
- L. pallescens** Stål (6) (7).
Borborocoris pallescens Stål (6) (= *punctatus* Signoret MS.).
La Guayra, Venezuela; Colombia; Nueva Granada (now Colombia) (6).
- L. pauper** Montandon (6) (7).
Cumbase, Brazil (6).
- L. pectoralis** Montandon (6) (7) (18).
Argentine Republic (6).
- L. profundus** Say (6).
L. profundus Stål (= *stáli* Montandon) (6).
L. punctatus Signoret MS. (6) (= *pallescens* Stål) (6).
- L. pusillus** Montandon (6) (7).
Novo Friburgo (Brazil) (6).
- L. signoreti** Montandon (6) (7).
profundus Signoret MS. (6).
Mexico (6).
- L. stáli** Montandon (6) (7).
profundus Stål, nec Say (6).
Venezuela; Guatemala; Bolivia; Ocana, Nueva Granada (now Colombia) (6).
- L. virescens** Montandon (6) (7).
Costa Rica; Buenos Aires (6).
- L. volxemi** Lethierry (18).
America (?) (18).

(Subfamily *Laccocorinae* Montandon (5).)

Genus **HELEOCORIS** Stål (5).

- H. spinipes** Montandon (5).
Novo Friburgo (Brazil) (5).

Genus **PELOCORIS** Stål (10).

- P. biimpressus* Stål MS. (10).
P. binotulatus Stål (10) (21).
 Rio Janeiro, Brazil; Pita, Darien (Panama); Argentine Republic (10).
P. bipunctulus Herrich-Schaeffer (10).
P. femoratus Palisot de Beauvois (6) (10).
impicticollis Fallou MS.
Naucoris poeyi Guérin.
P. horváthi Montandon (21).
 Urucu Corumba, Brazil (21).
P. impicticollis Stål (2) (10) (21).
P. impicticollis Fallou MS. (nec Stål) (10) (= *femoratus* Palisot de Beauvois).
P. magister Montandon (10).
 Novo Friburgo; Espirito Sancto, Brazil (10).
P. minutus Montandon (2).
 Rio Apa (Paraguay) (2).
P. nitidus Montandon (10) (21).
 L. Pita, Isthmus of Darien (Panama); Minas Geraes, Brazil; Llanos, Venezuela (10).
P. politus Montandon (2) (10).
 Rio Apa (Paraguay) (2).
P. subflavus Montandon (10) (21).
 Rio Grande (do Sul), Brazil (10).
Lotuca amyot Amyot? MS. (10).
Naucoris poeyi Guérin (10) (= *Pelocoris femoratus* Palisot de Beauvois).

Subfamily **CRYPTHOCRICINÆ** (8) (10).*Cryptocricinae* (4).Genus **CRYPTHOCRICUS** Signoret (8).*Cryptocriscus* Stål (nec Signoret) (4) (8).

- C. barozzi* Signoret (4) (8).
 Chile (4).^a
C. macrocephalus Montandon (8).
 Alta Vera Paz, Guatemala.

Genus **AMBRYsus** Stål (4) (8) (10).*Ambrysus* Montandon (2).

- A. acutangulus** Montandon (8) (10).
 Corrientes (Argentine Republic) (8).

^a This locality is Brazil, according to Champion, Biol. Cent.-Am., Het. II, p. 354.

- A. attenuatus** Montandon (4) (10).
Villa Rica, Brazil (4).
- A. bergi** Montandon (4).
Buenos Aires (Argentine Republic) (4).
- A. californicus** Montandon (4).
Southern California (4).
- A. crenulatus** Montandon (4) (8).
Ocana, Nueva Granada (now Colombia) (4).
- A. fraternus** Montandon (8).
Cuyaba, Goyaz (Brazil) (8).
- A. geayi** Montandon (8).
Darien (Panama) (8).
- A. guttatipennis** Stål (4).
Mexico (4).
- A. hybrida** Montandon (4).
Mexico (4).
- A. fucatus** Berg (4).
Tucuman and Córdoba, Argentine Republic (4).
- A. melanopterus** Stål (4).
Mexico (4).
- A. mexicanus** Montandon (4).
Mexico (4).
- A. oblongulus** Montandon (4) (8) (10).
Talamanca, Costa Rica (4).
- A. obscuratus** Montandon (10).
Pernambuco, Brazil (10).
- A. parviceps** Montandon (4).
Mexico (4).
- A. pudicus** Stål (4).
Mexico (4).
- A. pulchellus** Montandon (4).
Guatemala (4).
- A. puncticollis** Stål (4).
Texas (4).
- A. signoreti** Stål (4).
Mexico (4).
- Ambrysus** sp.? nymph (2).
San Pablo (Argentine Republic) (2).

Family BELOSTOMATIDÆ.

Genus **BENACUS** Stål.

- B. griseus** Say (Uhler, Riley) (3).
Belostoma distinctum Dufour, var. (3).
Belostoma grisea Say (3).

Belostoma haldemanum Leidy (3).

Belostoma harpax Stål (3).

Belostoma ruficeps Dufour, var. (3).

Benacus haldemanus Stål, Mayr (3).

Keokuk and Burlington, Iowa; Long Island (New York);
Rutland, Ill.; Pennsylvania; Florida (3).

Genus AMORGIUS Stål (1) (15).

Belostoma auct. (1) (10A) (15).

A. americanum Leidy (Riley) (*Belostoma*) (3).

Belostoma americanum Uhler (pro parte) (3).

B. griseum Mayr (pro parte) (3).

B. litigiosum Dufour (3).

Long Island, N. Y.; Minnesota; Lowell, Mass.; Iowa;
Fredericksburg, Va.

A. angustatum Guérin (*Belostoma*) (3).

A. angustipes Mayr (*Belostoma*) (3).

A. annulipes Herrich-Schaeffer (*Belostoma*) (3) (16).

Belostoma ruficeps Dufour (3).

B. signoreti Dufour (3).

Texas; Colorado; California; San José, Costa Rica;
Surinam (3).

A. camposi Montandon (16).

Guayaquil, Ecuador (16).

A. colossicum Stål (1).

colossicum Stål (Montandon) (16).

A. mayri Montandon (*Belostoma*) (3).

Brazil (3).

A. obscurum Dufour (*Belostoma*) (3).

Belostoma griseum Mayr (pro parte) (3).

Lowell, Mass. (3).

A. uhleri Montandon (*Belostoma*) (3).

Florida; Pennsylvania; Kansas.

Genus ABEDUS Stål (10A) (15) (19).

Deinostoma Kirkaldy (15) (19).

Pedinocoris Mayr (15) (19).

Serphus Stål (10A) (15) (19).

Stenoscytus Mayr (19).

A. breviceps Stål (19).

A. (Deinostoma) dilatata Say (19).

A. (*Pedinocoris*) *identata* Haldeman (19).

brachonyx Mayr (19).

A. (*Pedinocoris*) *macronyx* Mayr (19).

A. *ovatus* Stål (15) (19).

Stenoscytus mexicanus Mayr (19).

A. *signoreti* Mayr (19).

vicinus Mayr (19).

Genus BELOSTOMA Latreille (10A) (15) (19).

Diplonychus Herrich-Schaeffer (15) (19).

Perthostoma Leidy (15) (19).

Zaitha Amyot and Serville, Dufour, Mayr (10A) (15) (19).

B. *anurus* Herrich-Schaeffer, Dufour (*Zaitha*) (2) (19)
(= *boscii* Lepeletier and Serville) (15) (19).

Zaitha anura Herrich-Schaeffer, Champion (14) (19).

B. *asiatica* Mayr (19).

Z. asiaticum Mayr (Montandon) (19).

Z. boops Dufour, Mayr (14) (19).

B. *aurivilliana* Montandon (*Zaitha*) (14).

Colombia; Brazil; Venezuela (14).

B. *bergi* Montandon (*Zaitha*) (14).

Buenos Aires (Argentine Republic); Rio Grande (do Sul, Brazil) (14).

B. *bifoveolata* Spinola (*Zaitha*) (2) (14).

bifoveolatum Spinola (20).

Rio Apa and Asunción (Paraguay) (2).

B. *boops* Dufour (*Zaitha*) (14) (19) (= *asiaticum* Mayr) (14) (19).

B. *boscii* Lepeletier and Serville (15) (19).

Diplonychus anurus Herrich-Schaeffer (15) (19).

Zaitha anura Champion (14) (19).

Z. anurus Dufour, Mayr (2) (15) (19).

Z. cupreomicans Stål (19).

Z. subspinosus Dufour (19).

Rio Apa (Paraguay) (2); Florida; Southern United States; California; "Carolina(?)" (19).

B. *dentatum* Mayr (Montandon) (19).

Zaitha dentata Mayr (19).

Z. cumorpha Dufour, Mayr (2) (14) (19).

Santa Cruz (Mexico); Brazil; Venezuela; Guiana; Rio Beni, Bolivia (19).

B. *dilatata* Dufour (*Zaitha*) (14) (17).

- B. discretum** Montandon (20).
 Sao Paulo d'Oliveira, Amazon(as) and Manaos, Brazil;
 Province of Corrientes (Argentine Republic); Rio Apa
 (Paraguay) (20).
- B. elegans** Mayr (Zaitha) (2).
 Rio Apa (Paraguay) (2).
- B. ellipticum** Latreille (Zaitha) (19).
Zaitha elliptica Mayr, Montandon, Champion (14) (19).
 Mexico (19).
- B. eumorpha** Dufour (Zaitha) (2) (14) (= *dentatum* Mayr)
 (2) (14) (19).
 Luque (Paraguay) (2).
- B. fluminea** Say (19).
- B. foveolata** Mayr (Zaitha) (2).
 Rio Apa (Paraguay) (2).
- B. gestroi** Montandon (17).
 Argentine Republic; Paraguay (17).
- B. marginoguttata** Dufour (Zaitha) (14) (= *testaceopallidum*
 Latreille) (14) (19).
- B. martini** Montandon (Zaitha) (14) (20).
 Patagonia (14).
- B. mayri** Berg (19).
 Venezuela; Guiana; Brazil; Rio Beni, Bolivia; Argentine
 Republic (19).
- B. micantula** Stål (Zaitha) (2).
 Rio Apa and Asunción (Paraguay) (2).
- B. noualhieri** Montandon (20).
 Rio Grande do Sul (Brazil) (20).
- B. oxyura** Dufour (20).
- B. plebeja** Stål (Zaitha) (2) (20).
 Buenos Aires (Argentine Republic) (2) (20).
- B. subspinosa** Dufour (Zaitha) (19) (= *boscii* Lepeletier and
 Serville) (19).
- B. testaceopallidum** Latreille (10A) (15) (19) (20).
Zaitha carbonaria Dufour (19).
Z. marginoguttata Dufour (14) (19).
Z. marginopunctatum Dufour (Montandon) (20).
Z. stolli Mayr (19).

Family NEPIDÆ.

Genus **NEPA** Fabricius (1) (11) (19).

- N. apiculata** Harris, Uhler (11) (19).
cincta Ferrari (in part) (11) (19).
 New York; Illinois (19); Mexico (11) (19).

Genus CURICTA Stål (19).*Helotentes* Berg (Montandon)^a (19).*Nepoidea* Montandon, Martin (1) (19).**C. bonaerensis** Berg (*Helotentes*) (19).**C. borellii** Montandon (19).

San Francisco, Argentine Republic (19).

C. falloui Martin (*Nepoidea*) (19).**C. intermedia** Martin (*Nepoidea*) (19).**C. scorpio** Stål (19).*montandoni* Martin (19).**C. suspecta** Montandon (19).

S. Leopoldo (Brazil) (19).

C. tibialis Martin (*Nepoidea*) (19).**C. volxemi** Montandon (*Nepoidea*) (1) (19).

Santa Cruz, Mexico (1).

Genus RANATRA Fabricius (1) (9) (19).**R. annulipes** Stål (2) (22).

Rio Apa and Asunción (Paraguay) (2); Novo Friburgo, Brazil; Isthmus of Darien (Panama); Guadeloupe; Jamaica (22).

R. brevicauda Montandon (22).

Sao Leopoldo and Santa Catharina, Brazil (22).

R. macrophthalma Herrich-Schaeffer (22).

Carja, Bolivia (22).

R. robusta Montandon (22).

Faro Valley, Amazonas (Brazil); Colombia; Surinam; Carja, Bolivia (22).

R. signoreti Montandon (22).

Sao Leopoldo, Rio Grande do Sul, Brazil (22).

R. unidentata Stål (22).

Brazil (22).

Genus AMPHISCHIZOPS Montandon (9) (19).**A. compressicollis** Montandon (*Ranatra*) (9).

Venezuela (9).

^a Recte *Helotenthes*.

PROCEEDINGS
OF THE
ENTOMOLOGICAL SOCIETY
OF WASHINGTON.

VOL. VIII. SEPTEMBER-DECEMBER, 1906. Nos. 3-4.

FEBRUARY 10, 1906.

The 202d regular meeting was held at the residence of Dr. P. R. Uhler, 254 West Hoffman street, Baltimore, Md. President Banks occupied the chair and there were present Messrs. Ashmead, Banks, Barber, Bishopp, Burke, Caudell, Gill, Heide-
mann, Hooker, Hopkins, Howard, Knab, Morrill, Pierce, Sanborn, Sanders, Sasser, Schwarz, Stiles, Titus, Uhler, and Webb, members, and Messrs. Clemons and Weidheimer, visitors.

Doctor Howard read a letter from M. René Oberthür, Rennes, France, who was coöperating in the efforts to introduce into the United States parasites of the gipsy and brown-tail moths, in which the latter stated that he had forwarded quite a number of brown-tail moth nests to this country; in this connection Doctor Howard read an account, published in a newspaper of that region, of the collecting of brown-tail moths' nests, in which several amusing explanations were hazarded as to the purpose of this work.

—Doctor Howard read also a letter from Mr. A. H. Kirkland, superintendent for suppressing the gipsy and brown-tail moths in the Commonwealth of Massachusetts, in which, Mr. Kirkland quoted Mr. F. H. Mosher as stating that he had observed adult staphylinid beetles catching living flies. Mr. Mosher's note is as follows:

During the season of 1902 I had the opportunity to observe the feeding habits of *Staphylinus maculosus* Grav. Previous to this date I had frequently observed these beetles in the locations where they are commonly found, and had supposed that they were feeding upon the material

with which they were associated. Watching carefully, however, I observed that the beetles crept under the edge of the material, turned around, faced outward, and sprang upon flies as they came within reach. The flies were then taken into grass or under leaves near by and devoured. The beetles seemed usually to eat but two flies at a meal. Their preference seemed to be for the common blue-bottle fly (*Calliphora erythrocephala* Meig.), although a gray fly (*Sarcophaga*) was sometimes devoured. I have seen the beetles so feeding both in eastern New York and in Massachusetts.

A general discussion then ensued, Mr. Schwarz stating that the two groups of the Staphylinidæ are doubtless quite different from each other in their food habits; several species will apparently eat almost anything that comes in their way, while others seem to be strictly carrion feeders. Mr. Busck reported seeing Staphylinidæ feeding on larvæ on leaves; while Mr. Knab said he had seen them in the tropics resting idly on the vegetation. Doctor Ashmead stated that while he had never seen one of these beetles catch a living fly he knew them to be feeders on carrion and thought that they were predaceous also. Doctor Uhler reported observing *Staphylinus maculosus* feeding on dead animals and on the substance of toadstools, but on nothing else. Mr. Schwarz stated that this species is not uncommonly observed feeding on rotten fish, but he had never seen it feeding on vegetable matter. Doctor Ashmead said he had seen this or a closely related species in Florida feeding on one of the common toadstools after decay had set in. Doctor Hopkins stated that members of the family Staphylinidæ are often found in galleries of barkbeetles and that some species appear to be predaceous, while others are scavengers only.

—A query was read from Mr. G. K. Gilbert, asking about the construction of nests of *Pogonomyrmex* ants in the West, and the reasons for the pebbles and other coarser material placed on top. Discussion of this subject was participated in by many of the members. Mr. Schwarz spoke on the habits of *P. occidentalis* Cress. and Doctor Ashmead on the habits of *P. barbatus* Sm., both describing the nests as being as of the same general character—a large mound with a thick, more or less solid crust above composed of coarse material, such as cinders

(when near a railroad), pebbles, crystals, and small sticks. Mr. Barber believed that the ants cover their nests with these darker substances to conserve the heat. Mr. Knab thought that the crust is always composed of material gathered from the surface of the surrounding region. Mr. Caudell believed that the crust is simply for protection from wind and storm. Mr. Titus concurred in this and described his observations on the construction of the nests of a *Pogonomyrmex* in Colorado and the effect on the broken and unfinished nests of a high sweeping wind or a severe rain storm. He did not believe that the heat-conservation theory would hold, since in some regions the nests are covered with white crystals. It did not seem likely to him that an ant would place black substances on its nest along the railroad for any such definite purpose, while the same species, a hundred yards away, took white and red sand and gravel. Doctor Uhler described the large nests of *Camponotus pennsylvanicus* DeG. found by him near Baltimore several years ago, stating that these nests were sometimes 9 feet high and 10 feet across.

—Mr. Pierce exhibited a large series of photomicrographs taken by Mr. Barber, illustrating the morphology of some of the American Strepsiptera. Inasmuch as the subjects of these negatives are types, the negatives were denominated phototypes. The most important features brought out were the specific differences in the shape of the female cephalothorax, and also the differences in the triunguloids, or first larvæ. One print demonstrated well the fact that the female metathorax is a part of the cephalothorax. A number of prints showed the metathoracic spiracle of the female, and indicated the tracheæ as well. Mr. Pierce stated that up to that time no species had been found by him to inhabit more than one species of host. The different species are very readily recognizable from the females. Manuscript was then well in hand describing the various females and giving illustrations, as well as monographing the existent knowledge of the order.

Considerable discussion followed on the manner of distribution of triungulins, especially those of the remarkable meloid beetle *Hornia*.

—Mr. Caudell exhibited a colored drawing of a nymph of *Scudderia furcata* Brunn. This brightly colored nymph is not uncommon in the vicinity of Washington, D. C. A nymph of one species of this genus, probably the same as here mentioned, was described by Mr. J. A. G. Rehn as *Spilacris maculatus*, new genus and species in the Stenopelmatinæ.

—Doctor Stiles propounded the query, "Why does not an insect grow as large as a crow or other animal?" Considerable discussion followed, and it was asked by Mr. Banks, "Why does not a crow get as small as a beetle." Dr. Morrill thought that the insect's size was governed by the mechanical difficulty of construction of muscles and Doctor Ashmead believed that its size was limited by the fact that an exoskeleton heavy enough to contain the necessary organs and to furnish support for the muscular attachment would be too heavy to move.

—Mr. Weidheimer exhibited some well prepared specimens of *Citheronia regalis* Fab., and of what he considered to be the rarer species, *C. infernalis* Strecker.

—Mr. Banks presented a note on a proposed new classification of the Limnephilidæ, a family of the Trichoptera. He stated that the spur formula, the present basis of classification, had long been known to be defective in many cases. He had therefore sought many times for other characters, especially in the venation and in the chætotaxy of the vertex. Differences in these respects are useful in grouping genera, but not of sufficient importance to serve as primary characters of subdivision. Recently, however, he had found a minute character which would divide the family into two nearly equal groups. This character is the presence or absence of spines on the last joint of the hind tarsi. The application of this character would divide several heteromorphous genera, as *Stenophylax* and *Halesus*. This minute difference, although seemingly trivial, is constant; at least more constant than is the spur formula. Specimens illustrating this character were shown.

—Mr. Banks presented also a note on a new classification of the ticks or Ixodoidea. The family Ixodidæ he divided

into two subfamilies, Ixodinæ, with Ixodes and Ceratixodes; and Amblyomminæ, with four tribes, as follows: Hæmaphysalini, for the genus Hæmaphysalis; Rhipicephalini, for Rhipicephalus and Boophilus; Amblyommini, for Amblyomma, Hyalomma, and Aponomma; and the Dermacentorini for Dermacentor.

—Doctor Stiles stated that he had been mistaken in some tick identifications made several years ago, and having lately had the opportunity of examining the types of several species he could now correct these errors. He had found the stigmal plate characters to be excellent. The species concerned are *Dermacentor reticulatus*, *D. occidentalis*, *D. andersonii*, and *D. quinquestriatus*. *D. occidentalis*, in his early determinations, is *D. andersonii*, and *D. reticulatus* is *D. quinquestriatus*.

—Dr. Ashmead presented a motion thanking Doctor Uhler for his kind and bountiful entertainment and expressing the pleasure of the Society in meeting with him in Baltimore. The motion was carried unanimously and Doctor Uhler responded that the pleasure was all his and that he wished that the Society could meet in Baltimore more frequently.

MARCH 1, 1906.

The 203d regular meeting was held at the residence of Lambda Chapter, Φ Ξ K, 2002 G street, N. W., the Society being there entertained by Messrs. Couden, Hooker, and Morrill. President Banks occupied the chair and the following persons were present: Messrs. Ashmead, Banks, Barber, Barrett, Beattie, Bishopp, Burke, Busck, Condit, Couden, Currie, Dyar, Gill, Heidemann, Hooker, Hopkins, Johnson, Knab, Morrill, W. J. Phillips, Pierce, Quaintance, Reeves, Sanders, Sasser, Schwarz, Titus, and Webb, members, and Messrs. J. C. Mulder and J. F. Strauss, visitors.

The Society passed the following resolution:

Resolved, That members should furnish the recording secretary with abstracts of all their communications to the Society which are not in the form of written papers, and, in case this is not done, that the reports of such communications as given

in the minutes and corrected at a regular meeting of the Society be considered as final.

The resignations from corresponding membership of Messrs. Clarence M. Weed and W. G. Johnson were presented and accepted.

The corresponding secretary, in presenting his customary report, called for donations from members of the Society of separates of their papers, published either in the PROCEEDINGS OF THE SOCIETY or elsewhere, the same to be incorporated in the price list to be published of papers offered for sale for the benefit of the Society.

M. George W. Bock, 1315 Hickory street, St. Louis, Mo., and Mr. C. F. Adams, Fayetteville, Ark., were elected to corresponding membership.

Doctor Stiles proposed the following resolution, which was adopted by vote of the Society:

Resolved, That the Society instruct its committee on publication to insist that every new generic name submitted for publication be accompanied by a definite designation of a type species, and that new generic names not so accompanied be excluded in the future from the publications of the Society.

Mr. Burke exhibited specimens of larvæ, pupæ, and adults of the ædemerid beetle *Calopus angustus* Lec., and presented the following notes:

NOTES ON THE LARVA OF *CALOPUS ANGUSTUS* LEC.

By H. E. BURKE.

Calopus angustus is an insect of wide range, both geographically and according to food plant. One adult was reared by the writer from a full-grown larva found in a gallery in the sound heartwood of a living western cedar (*Thuja plicata*). It had entered through the rotten wood of a hollow butt. This tree was at Pialschie, State of Washington, quite close to sea level. The larva was found July 3, 1905; it changed to pupa July 15, and issued an adult female on August 10.

On August 23 and 25 a number of small to large larvæ, pupæ, and fragments of dead adults were found in galleries in dead and living wood of Alpine fir (*Abies lasiocarpa*).

Infested trees were quite common at the timber line on Mt. Rainier, Washington—altitude about 9,000 feet. On August 27, one pupa changed to an adult male; September 3, two pupæ changed to adult females; and on September 8 another pupa changed to an adult male.

The insect seems to do extensive damage to living trees by entering small injuries and working into the surrounding living tissues, thus causing wounds that remain open, and enlarge instead of healing over.

Adults have been taken in Texas, New Mexico, Canada (Quebec), Nevada, California, Oregon, and Washington.*

The larva differs from all the other *œdemerid* larvæ of which descriptions or specimens could be found in the following grosser characters: In having no pair of ambulatorial pads on the dorsal surface of the first thoracic segment; in having pairs of such pads on both the 4th and 5th abdominal segments; in having well developed abdominal feet, instead of mere ambulatorial teats; in having a pair of these feet on the ventral surface of the 5th abdominal segment, a rudimentary pair on the anterior ventral surface of the 9th abdominal segment, and a pair of strong dark recurved hooks, with a dark depression between, on the posterior surface of the 9th abdominal segment.

The larvæ of the *œdemeridæ* illustrate very well the variation in the ambulatorial pads and abdominal legs. As nearly as could be determined from the descriptions read and specimens studied, *œdemera* is the most generalized member of the family and *Calopus* the most specialized.

œdemera larvæ, descriptions of which the writer has seen, have a pair of horny plates—probably rudimentary ambulatorial pads—on the dorsal surface of each of the dorsal segments, and no abdominal legs. Larvæ of *Ditylus* (descriptions seen), *Nacerdes* (descriptions seen and specimens examined), and *Xanthochroa* (descriptions seen and specimens examined) have ambulatorial pads on the dorsal surface of the 1st, 2d, and 3d thoracic and 1st and 2d abdominal segments, and abdominal legs on the ventral surface of the 3d and 4th abdominal segments. *Chrysanthia* (descriptions seen) has five pairs of dorsal ambulatorial pads and three pairs of abdominal legs, one pair being on the ventral surface of the 2d abdominal segment. *Oxacis* (specimen examined), *Probosca* (specimen examined), and *Asclera* (specimen examined) have six pairs of the ambulatorial pads, one being on the dorsal surface of the 3d abdominal segment, and three

* *Vide Horn*, Proc. Cal. Acad. Sci., 2d ser., Vol. vi, p. 385.

pairs of abdominal legs. *Calopus* (specimens examined) has seven pairs of ambulatorial pads; the one on the prothorax is missing, but there are two additional pairs, one being on the 4th and the other on the 5th abdominal segment. There are four pairs of the abdominal legs, one pair being on the ventral surface of the 5th abdominal segment.

—Doctor Hopkins exhibited sketches of the clypeus and labral hooks of the larva of *Calopus angustus* Lec., the beetle referred to in the previous note by Mr. Burke. From his further studies of coleopterous larvæ he had, he stated, found additional evidence to indicate that the labrum represents a primitive segment.

—Mr. Titus read the following note for Professor Webster:

NOTE ON HADENA SEMICANA WALKER AND H. MISERA GROTE.

By F. M. WEBSTER.

Late in June, 1903, the writer's attention was called to injuries to young corn in Trumbull County, Ohio, caused by noctuid larvæ, but the method of attack was quite in contrast with that of any other larvæ known to him. By rearing some of these larvæ, among which no differences whatever could be detected either in appearance or method of attack, two so-called species were obtained, viz, *H. fractilinea* Grote (now considered a variety of *H. semicana*) and *H. misera* Grote. For this reason the writer has never been able to look upon the present arrangement of these forms as satisfactory.

From larvæ one-half to two-thirds grown, taken at this time, imagoes of both forms appeared during the last days of July and up to August 10. Their method of attacking the corn was quite unique, in that they crawled up the plants and eating downward devoured the whole stem to near the roots. If the plant happened to be a small one, 2 or 3 inches high, the larva entered the folded younger leaf, but if the plant was larger it ate along the edges of the central leaves until it reached the more tender portion and then worked directly downward. At that time the writer was unable to find any published statements relative to the habits of these insects, nor has anything of that nature since appeared.

On June 13, 1905, after the lapse of twelve years, reports of injuries of a precisely similar nature, accompanied by larvæ

clearly like those observed in Ohio, were received from Mercer County, Pennsylvania, which adjoins Trumbull County, Ohio. The farmer sending the larvæ described their work, and stated that they had appeared in his section for the first time. Of course this last statement is incorrect, but it might be safely said that they had not been seriously abundant before.

While both of these so-termed species are widely distributed, it is interesting to note with what rarity they occur in destructive numbers, even in approximately the same locality.

The question of the identity of these two forms must, of course, still remain obscure until further rearings can be made. That two species, differing only or even mainly in color, whose larvæ are not distinguishable in appearance or method of attack, should inhabit the same locality and food plant would constitute an interesting biological problem.

Of the writer's Ohio specimens, *H. fractilinea* was first determined for him by Prof. G. H. French; and *H. misera* by Prof. John B. Smith, who stated that he had in his collection a specimen of this latter form taken in Colorado by Bruce, and another one bred by Dr. Otto Lugger; also several specimens of *H. fractilinea* from Doctor Lugger, which he thought were reared also.

A rather poorly illustrated note on these forms will be found in Bulletin 51, Ohio Agricultural Experiment Station, pages 139-141, figures 22 and 23, 1893.

—Doctor Stiles presented the following note:

THE TYPE SPECIES OF CIMEX LINNÆUS, 1758.

By CH. WARDELL STILES.

The writer has been requested to examine the question of the type species of the genus *Cimex* Linnæus, 1758, and to place his opinion in regard to the same on record. After an examination of the literature covering the case, he is of the opinion that *lectularius*, the common bedbug, is the type of *Cimex*. This decision is based upon the Linnæan rule. Linnæus in 1751 gave the following rule to govern the division of his genera:

"Si genus receptum, secundum jus naturæ et artis, in plura dirimi debet, tum nomen antea commune manebit vulgatissimæ et officinali plantæ."

It seems to be beyond question that *lectularius* was the most common of the species of *Cimex* mentioned by Linnæus, and

in a certain sense it is also an officinal species. Since Linnæus clearly stated the principles that govern the division of his genera, he should be taken at his word and the type should be fixed accordingly. To take Linnæus at his word results in selecting *lectularius* as the type of *Cimex*.

To the objection against this ruling raised by some authors, namely, that Linnæus defined *Cimex* as possessing four wings while *lectularius* was given without wings, it may be replied that in naming a genus we name the object, not our conception of the object. Hence the generic diagnosis given by Linnæus should not be held to be of greater importance than the distinct statement by Linnæus that in case of a division of his genera, the old generic name should follow the most common species.

—Mr. Phillips exhibited a puparium resembling that of the Hessian fly (*Mayetiola destructor* Say) taken the summer before on a native grass (*Agropyron*), at Richmond, Ind. He was unable to say whether or not it really was that of the Hessian fly. Larvæ of the latter are thought to survive only on wheat, barley, and rye, and the "flaxseeds" sometimes found on various native grasses have been supposedly the pupæ of some other species more or less closely related to the Hessian fly.

—Mr. Heidemann exhibited three new species of the hemipterous genus *Aradus* and presented the following paper:

THREE NEW SPECIES OF NORTH AMERICAN ARADIDÆ.

By O. HEIDEMANN.

Aradus shermani, n. sp.

Body narrow, very elongate ovate, uniformly deep black, and finely granulate. Head much longer than broad; apical process straight, extending beyond base of second antennal joint, rounded at tip, compressed on the sides; antenniferous processes sharply pointed, slightly diverging, and not quite reaching to tip of basal joint of antennæ; on the disk of head between the eyes is a U-shaped deep impression; the postocular part of head tumidly rounded. Antennæ smooth, as long as head and pronotum together; basal joint very short, cylindrical; the second a trifle longer than twice the length of the third, both gradually thickening towards the apex; apical joint somewhat shorter than the penultimate, fusiform, pale at tip. Rostrum slender, reaching to the

mesosternum. Pronotum sublunate, nearly flat, more than twice as broad as long, widest at the middle; lateral margins not rounded anteriorly, somewhat reflexed and sharply toothed; posterior margin widely sinuate and forming broadly rounded flaps behind the humeri; on disk of pronotum are six longitudinal lines, the last ones much abbreviated; in the female the median lines approach each other in the middle, while the male has these longitudinal lines parallel. The shield-like scutellum longer than pronotum, with two sunken points at base, and tumidly elevated before the middle. Hemelytra much narrowed towards the tip, reaching the base of the sixth abdominal segment; the male has the hemelytra broader and longer; the corium is at its base only feebly dilated exteriorly, a little upturned, the dilation not extending laterally farther than the pronotum; membrane with the veins dull black, except at base, where there is a small oblong whitish spot. Abdomen long and narrow in the female, shorter in the male; edge of abdomen finely crenulate.

Length, ♀ 7.4 mm., ♂ 6.8 mm.; width across abdomen, ♀ 3.4 mm., ♂ 3 mm.

Three females and one male, Southern Pines, N. C., June, 1904 (Sherman); Greensburg, Pa. (Wirtner).

Type.—No. 9866, U. S. National Museum.

This species might, at first sight, be easily confused with a dark specimen of *Aradus acutus* Say. But on closer examination a considerable diversity becomes evident. Say's species is larger and broader and has the antennæ stouter and longer. I have named the species in honor of Prof. Franklin Sherman, Jr., who has extensively collected the Aradidæ of North Carolina.

***Aradus coarctatus*, n. sp.**

Body compact, short, nearly subquadrate, the broadest part behind middle of abdomen. Color dark brown, with some paler spots. Head a little longer than broad; apical process much compressed on the sides; rounded in front, somewhat tapering towards tip and reaching nearly to one-third the length of the second antennal joint. Lateral spines of head broad at base, a little diverging exteriorly, extending to apex of basal joint of antennæ, and having at about the middle of sides a minute tooth; there is also quite a prominent tubercle in front of the eyes and another obtuse one on the postocular part. Antennæ very long and thick in comparison with the size of the insect; basal joint of antennæ short, only half as broad as the two following ones; the second joint abruptly pointed towards the base, in length equal to the two last joints; the third somewhat longer than the fourth; joints 2 and 3 strongly covered with close, thick, and erect squamules; terminal joint less stout and more smooth, finely hairy and whitish at tip. Rostrum

extending slightly over the front coxæ. Pronotum sublunate, a little more than twice as broad as long, and shorter than the head; the surface rather flat, remotely granulate, more densely on the posterior part of pronotum; anterior margin straight, the posterior one feebly sinuate; lateral margins anteriorly somewhat rounded, broadly reflexed and irregularly toothed, the teeth becoming finer towards the humeri; the rounded humeral flaps not prominent, with the inside margin narrowly pale; the longitudinal ridges on disk of pronotum roughly granulate, the two middle ones nearer together than the others, touching the anterior margin, the others interrupted. The scutellum seems rather small, and, as in all three specimens before me the pins are unfortunately thrust through the scutellum, a definite description of that part can not be given. Hemelytra pale, the edges, veins, and cross-veins strongly granulate, dark brown; the corium on the outer margin nearly straight, extending to base of fourth abdominal segment of the connexivum, at apex pointed; the exterior rounded expansion at base of corium not prominent, the edge a little upturned and finely denticulate; membrane brownish and the veins and spaces around them whitish. Wings iridescent. Abdomen reddish brown, with some paler marking, densely and finely granulate and minutely pubescent; abdomen at middle deeply furrowed longitudinally. Genital segment of male abruptly deflexed posteriorly, the genital lobes a little upturned, broadly rounded and incised at the inner sides. Feet yellowish white, with brown bands at middle of femora and tibiæ, and at the knees; apex of tibiæ and tarsi clouded with brown.

Length, ♂, 4.4 mm.; width across abdomen, 2.2 mm.

Three males, California (Coquillett).

Type.—No. 9867, U. S. National Museum.

This species is easily distinguished from other allied forms by the comparatively stouter antennæ and larger head. It resembles *A. ornatus* Say in the form of the antennal joints and somewhat also in robustness of body, but differs in being considerably smaller and very differently colored, and it has the widest part of pronotum behind the middle, contrary to Say's species, which has its pronotum wider towards the front.

***Aradus compressus*, n. sp.**

Body large and thin, broad, ovate; color dull black. Head longer than broad, finely granulate, the granules at the disk in longitudinal rows; the sides inside next the eyes a little excavate, with a deep sunken point before; anterior process of head very long, narrow, rounded off at tip and reaching beyond base of second antennal joint; the antenniferous spines long and very acute, the outer side straight. Antennæ in length about equal to the broadest part of pronotum; first joint shortest, cylindrical, as stout as the apical joint; the second

twice as long as the third, gradually thickening towards the apex; third joint equally thick; last joint fusiform, pale at tip; all the joints minutely granulate and a few scattered granules of a whitish color appear. Pronotum twice as broad as long; lateral margins strongly and broadly reflexed near the middle, anteriorly deeply sinuate, posteriorly rounded, then nearly rectangular next to the humeri, with a narrow yellowish edge; humeral flaps somewhat depressed; edge of lateral margins minutely dentate; anterior margin straight, narrowly carinate; posterior margin almost truncate; the frontal disk carries longitudinal prominently raised lines, the inner two approaching each other at the anterior margin, the others interrupted by the callosities, which are defined only feebly; the surface of pronotum is finely granulate, especially on the posterior part, in transverse rows. Scutellum cordate, having the margin strongly raised and the surface before the middle slightly tumid. Hemelytra long, with the membrane dull black and broadly rounded at the end; corium a little sinuate on the outer sides and the basal part only feebly dilated and reflexed, the apex reaching beyond the base of the fourth abdominal segment at the connexivum. Abdomen gradually rounded towards back of the middle, where it is widest; the upper side of abdomen blackish-brown, the posterior segmental margins somewhat elevated on the connexivum, and externally at their angles near the incisures is a small ochraceous spot; the inner margin of the female genital lobes is also edged with ochraceous; underside of abdomen at the venter flat, near the sides much compressed and marked with reddish brown; venter narrowly keeled throughout the middle. Posterior margin of the fifth ventral segment trisinate; the sixth feebly incised at the middle, longer than the first genital segment, which is nearly thrice the length of the second; the genital lobes, seen from below, rather long, converging, but considerably apart from each other; the outer margins straight, a little knobbed in the middle, the inner margins rounded and meeting the outer angle of the second genital segment.

Length, 8 mm.; width across abdomen, 3 mm.

Two females, Washington State (Ulke); Seattle, Wash. (Uhler).

Type.—No. 9868, U. S. National Museum.

This species has a great resemblance to *Aradus ampliatus* Uhl., but differs from it essentially in the shape of the female genital lobes, which are much shorter in *A. ampliatus*, truncate at apex, and only slightly incised in the middle; furthermore, the latter has a more robust body and the pronotal sides are not sinuate anteriorly. Prof. P. R. Uhler has kindly presented me with a specimen from his collection that bears the manuscript name of *A. compressus*. In describing the species I gladly adopt this name.

Mr. Schwarz asked Mr. Heidemann how much is known of the eggs of *Aradidæ*. Mr. Heidemann replied that little is known concerning the eggs. He himself had found eggs of only one species, namely, *Neuroctenus simplex* Uhler. These were under the bark of oak and resembled the eggs of the bed-bug. Mr. Sanders stated that he had found eggs of *Aradus cinnamomeus* Panz. under loose bark of *Pinus inops*. They were placed in a cottony nidus resembling that of *Pulvinaria*. Doctor Ashmead stated that he had never found *Aradidæ* under living bark, but he had found them under the bark of orange trees killed by frost, in Florida. Mr. Heidemann stated that on two occasions he had found *Aradus brevatus* Bergroth under the living bark scales of pine trees near Washington, D. C. Mr. Burke gave it as his belief that one of the western species, *Aneurys simplex* Uhler, occurs under scales of bark of living spruce trees.

—The following paper, by Dr. G. W. Harvey, of Adin, Cal., was then read by the recording secretary :

A FEROCIOUS WATER-BUG.

(*Pedinocoris macronyx* Mayr.)

By G. W. HARVEY, M. D.

In the warmer streams and ponds of California lives a creature whose character is aptly portrayed by the word ferocious. He might be termed a giant for his fierceness and strength were it not for the fact that the so-called electric light bug is a neighbor of his and about twice his stature. Among the children who go wading in the streams this bug is known as "toe pincher," because he frequently mistakes their toes for lawful quarry and thrusts savagely into them with his scimitar-like proboscis. They tell me that his bite is very painful, though not at all dangerous.

Scientifically this bug bears the title of *Pedinocoris macronyx*. It is of a uniform dull brown color, with a barely perceptible mottling on the elytra. The females are possibly a shade darker than the males. It has protruding beady black eyes, and its head terminates in a long curved proboscis about 7 millimeters in length, which gives it a very odd and savage appearance. Its legs are hairy, and armed with sharp curved claws, very long and prominent on the two front legs, which

are placed well forward and work in a vertical plane. These legs are jointed at a very acute angle in the second joint, and the claws on them can be bent down upon the first joint of the leg, thereby clamping the prey as in a vice. It is with these powerful and formidable front legs that it captures its prey. In size it is $3\frac{1}{2}$ centimeters long, with a reach of $1\frac{1}{2}$ centimeters more to its front legs and a breadth of 2 centimeters across the back.

Nature has gifted this bug with a voracious appetite. Its aggressive prowess as a hunter is something appalling to the owner of an aquarium who chances to secure a specimen, and I well remember my first experience with it. My aquarium contained a beautiful collection of aquatic insects, fish, snails, tadpoles, etc., from the streams about Watsonville, Cal., and it was on a collecting ramble that I discovered *Pedinocoris*. To me it seemed a wonderful insect and I took it home highly elated over the prospect of a new creature to study. That night I placed it in the aquarium and I was around early the next morning to see how it had fared in its new quarters. Imagine my astonishment to find it sitting complacently on a stalk of *Sagittaria* devouring a beautiful trout, almost, if not quite, 3 inches long, while all about were scattered the exsufficated skins of many victims—young frogs, tadpoles, fish, snails, and various smaller fry. He had fared altogether too well—much like a weasel in a hen-house. At that rate my aquarium would soon be totally depopulated, so I removed the bug to less commodious and more sparsely populated quarters, and confined it to a diet of tadpoles and young frogs. Of these it would devour dozens in the course of twenty-four hours. The prey were captured, as they swam near, by a sudden dart forward. The hooked front legs were suddenly thrown over the victim, and the sharp proboscis was thrust into the quivering flesh, not to be withdrawn until the skin was a limp and flabby sack of lifeless refuse.

The habit of *Pedinocoris* was to lurk in the most secluded and darkened places, backing up occasionally to the surface for a breath of fresh air, and quite often, after returning to the lurking place, raising and lowering the wing-sheaths as though breathing, for beneath these could be seen a large bubble of air, advancing and receding with the up and down motion of the wings. When I took it from the water it would play possum for five or even seven minutes, but when aroused it was full of life, and if held firmly for a moment or two it would eject a few drops of clear liquid, even to a distance of 3 or 4 feet.

Occasionally, it would come stealing to the surface where

a thick mass of duckweed was floating, extrude the spiracles, and make a soft chirping noise, not unlike a subdued cricket song. It was some time before I could make out just where the music came from, but I finally succeeded in observing the act, and verified it a number of times. That a song could emanate from so odd a source as the rectal spiracles of a water bug seemed unnatural, but such is the fact. When the bug was engaged in chirping one had to look very closely among the duckweed to discover the spiracles, but, once found, a rhythmical contraction and relaxation could be distinctly observed with every note of the song, which was produced much more slowly than that of our cricket.

The breeding season of this water bug at Watsonville, Cal., where it is very abundant, is from April to June, and during this time from two to four sets of eggs are hatched. The eggs are glued tight and fast to the back of the male, and there they stay through the whole period of incubation. Upon the wing sheath of the male is first spread a drop of mucilaginous adhesive. Into this drop of adhesive are fastened the eggs, one at a time, closely together, at all angles from perpendicular in the center of the clutch to a cant of 45° at the edges of the wing sheaths. From 70 to 175 eggs are deposited upon the back of the male, but not all at one time. Part of them will be deposited one night and the rest the next or succeeding nights. This work is all done in the dark and I was never fortunate enough to observe it. If a spot of two, three, or more eggs is missed, it is filled in afterwards, and should some of the eggs prove to be infertile, these drop off and are replaced by others as late as the sixth or eighth day of incubation.

Incubation lasts from ten to twelve days, at the end of which time the egg cases and adhesive nidus that holds them are cast off entire, providing there be no late-laid eggs, in which instance the empty egg cases and nidus remain attached until all are hatched. The cast-off mass of egg cases and nidus resembles a knobbed shield, being oblong-oval, with the concave side towards the male's back. The eggs are 5 millimeters long by 1 millimeter thick and are of the same color as the parent. During the period of incubation the male spends much of his time in aerating the eggs. This is accomplished by gently raising and lowering the wings so that the air taken in at the surface and held under the wing cases is moved back and forth beneath the mass of eggs, and taken up a little at a time. If by any chance the male should be removed from the water for a few hours during incubation, the whole mass of eggs—nidus and all—loosens and comes off.

At the end of incubation the male comes to the surface and

with his back partly out of the water the young begin to appear. The first thing seen after the rupture of the egg case is a pair of beady black eyes. At the first appearance of the young the male begins raising and lowering the wings, at the same time going through a jerking manœuver at regular intervals. The young insect is extruded from the egg by easy stages, the hatching being accomplished in from seven to twenty-five minutes. At birth the young bug is about 5 millimeters long by 2 millimeters broad, of the purest white, rapidly changing to a light straw-yellow and brown. In two or three hours at most it is of the same color as the parent and, if prey be not abundant, very likely feasting on its fellows. This latter trait is evidently hereditary, since the parent often makes a meal of its own offspring.

These bugs disdain nothing for food that they can handle, dead or alive. They often come to the surface for floating insects, worms, moths, butterflies, dragonflies, grasshoppers, crickets, caterpillars, etc., and after extracting all the nourishing properties cast the skins aside. Their migrations are made at night.

Mr. Burke stated that the range of this species extends up into the eastern part of the State of Washington, and that there its common name is "toe-biter," not "toe-pincher."

APRIL 5, 1906.

The 204th regular meeting was held at the residence of Dr. Wm. H. Ashmead, 1807 Belmont avenue, N. W. President Banks occupied the chair and the following members were present: Messrs. Ashmead, Banks, Caudell, Currie, Hopkins, Knab, Quaintance and Titus.

By vote of the Society the Executive Committee was instructed to take action relative to the storing of the publications of the Society in some fire-proof storage building.

Doctor Hopkins exhibited a drawing of the reproductive organs of females of the genus *Pissodes* and explained the use and mechanism of the spermatheca in these beetles.

—Doctor Hopkins showed also some hibernation cells of larvæ of the locust borer (*Cyllene robinia* Forst.), a cerambycid beetle. These are formed just beneath the outer corky bark and in the outer portion of the living inner bark of the black

locust (*Robinia pseudacacia*). The wound thus produced results in a small dead area surrounding the cell, which was found to extend through the thick inner bark to the wood itself. The hibernating larvæ are very small. Normally but one egg is deposited by the beetle in a place, instead of clusters of from 4 to 9 as stated by Gen. H. A. S. Dearborn, who was the first to record the more important facts in the life history and habits of this insect. The beetle selects healthy spots for oviposition, thus making the injury more extensive than it would otherwise be. The dead portion of the plant tissue around the larval cells resembles somewhat the bark killed by the pear blight and seems to be of a similar nature.

—Mr. Caudell reported that assistants of Mr. A. H. Kirkland, Superintendent for Suppressing the Gipsy and Brown-tail Moths, had lately taken from 25 to 30 cocoons of a Japanese limacodid moth (*Cnidocampa flavesceus* Walk.) near Cape Cod, having mistaken them for those of the gipsy moth. This species was introduced into North America many years ago, but has not been taken before in the Cape Cod region, so far as known. In this connection Mr. Caudell stated that Doctor Dyar had experienced considerable difficulty in inducing bred limacodid moths to mate in captivity. Mr. Knab stated that, as regards chrysomelid beetles, most of those that emerge in the fall do not mate until the following spring, and he thought that some similar explanation might account for this failure to mate in the case of the limacodids. Professor Quaintance stated that he had a record for the plum curculio in which specimens mated in summer almost immediately after emergence from the pupa, and larvæ therefrom were reared almost to maturity. Doctor Hopkins stated that in Europe bark weevils of the genus *Pissodes* do not mate until a year after they emerge and are known to live three years and to oviposit each year. Mr. Knab stated that he had reared the larva of the cerambycid beetle *Orthosoma brunneum* Forst. to the pupa in an old railroad tie. Doctor Hopkins stated that larvæ of the locust borer (*Cyllene robinia* Forst.) develop, transform, and emerge from a gallery little more than twice the length of the full-grown larva. Larvæ under dry conditions completed their

development and emerged thirty days earlier than those under moist conditions. Professor Quaintance said that the same thing holds true for the peach borer (*Sanninoidea exitiosa* Say), the larvæ from nearly dead trees transforming before those from trees which are living and more or less vigorous. He then described the method of birth and the prolificacy of the black peach aphid (*Aphis persica-niger* Er. Sm.) no males or eggs of which, as is also the case with the cabbage aphid (*Aphis brassicae* L.) and the cotton or melon aphid (*Aphis gossypii* Glov.), have ever been found. Mr. Titus stated that some specimens of the melon aphid had been known to reproduce agamically for two years. During all this time they were under observation and it was known that no eggs were laid.

—Mr. Banks made some remarks on the classification of the Perlidæ and on the characters which he had found to be most valuable in the separation of the various groups. Doctor Hopkins asked him whether there were good sexual characters in the Perlidæ, and Mr. Banks replied that there are characters in the anal plate. Doctor Ashmead said that there are characters in the anal veins of saw-flies, but that these disappear in the higher Hymenoptera.

—Mr. Knab made some remarks on the habits of South American passalid beetles. Among other things he stated that they seem to be monogamous. The larvæ are cared for by the adults, and this care is evidently necessary to the larvæ.

—Doctor Ashmead reported the taking of a ponerid ant, *Leptogenys falcigera* Rog., in the Philippines. It had previously been recorded from Ceylon and Madagascar.

—Mr. Banks presented the following paper:

A REVISION OF THE NEARCTIC CONIOPTERYGIDÆ.

By NATHAN BANKS.

(PLATES VI, VII.)

The Coniopterygidæ are a small and peculiar family of the true Neuroptera. One of the most characteristic marks of the family is the mealy exudation upon the wings and some parts of the body. More vital structures, however, distinguish the group from its allies. The antennæ are short, moniliform,

and hairy; the wings have very few transverse veins, rarely as many as 10, and no series of costal cross-veins such as is found in all other true Neuroptera, nor are the veins forked just before the margin as in nearly all allied forms. The maxillary palpi have five joints, the last joint longer and more slender than the others; the labial palpi have three joints, the last joint large and compressed. There are no ocelli. The hind wings are smaller than the front pair, without anal space, and the margin is very minutely ciliate. The legs are moderately long; the middle and hind tibiæ are often fusiform; the tarsi are of five joints, the basal joint the longest; the claws are simple. The abdomen is shorter in the male than in the female; the genitalia are not very distinct; but I have figured their shape in the males of two species.

The adults can be collected from various trees and shrubs in late spring and summer by beating.

I have found the larva of *Coniopteryx* several times on the leaves of various trees at and near Washington, D. C. It is a rather flat, fusiform larva, broadest on the mesothorax, having a triangular head, with the middle portion slightly extended, and antennæ that are two-jointed and cylindrical. The color is dark reddish or brown, with bands and spots of white. The tip of the abdomen ends in a slender sucker. In California Professor Woodworth has observed the larva of a *Coniopteryx*—a mottled black and white larva—sucking the eggs of the red spider. He noticed that when fully grown it spun a double cocoon, made up of an outer flat layer and an inner spherical case.

In Europe the larvæ of two genera, *Coniopteryx* and *Aleuropteryx*, have been described by Löw. The former has a very slender beak and slender palpi; the antennæ are also simple, of two joints, the second much the longer and tapering to the tip. In *Aleuropteryx* the beak is short and broad at base; the palpi have the terminal joint greatly swollen; the last joint of the antennæ is truncate at tip and rather broader there than elsewhere, and has a long bristle; the body is more slender than in *Coniopteryx*.

The *Aleuropteryx* larva was found feeding on scale insects on a pine tree. It pupated in a double cocoon, composed of an inner dense spherical case and some loose outer layers. It remained in the pupal state twenty days. Dr. Löw, who bred this larva, believed that there were two generations in a year. I think that our eastern species have two generations each year, as Mr. J. H. Emerton has recently bred *Coniopteryx vicina* from cocoons found during the winter.

These tiny mealy-winged insects were a puzzle to the early

entomologists, yet the first species described—by Müller in 1767—was placed correctly in *Hemerobius*, as that genus was then understood. Other authors, however, placed them in the caddice-flies, in the *Psocidæ*, and in the *Aleyrodidæ*. Westwood was the first to show their true position, and Burmeister the first to consider them a distinct family.

Very little work has, until recently, been done on the *Coniopterygidaë*, either in this country or in Europe. In 1885 Dr. Franz Löw published a revision of the then known European forms, and recently Dr. G. Enderlein of Berlin has given us several papers, including an elaborate classification and a monograph. On one important point, however, I differ from that author as to the type of the genus *Coniopteryx*. Curtis* gives *C. tineiformis* as the type of his genus *Coniopteryx*, and gives figures of the venation. In his generic description he says that there are three closed cells in both wings; and the figures show that in the hind wing the median vein is forked as well as the radial sector, and that in the fore wings the connecting veinlet from the cubitus runs into the lower branch of the median vein, instead of directly into the median vein; in other words, the venation is on the same plan as Löw figures for *C. aleyrodiformis*. Löw considers that Curtis had two species in his *C. tineiformis*, for Curtis says, "antennæ about 25 joints," and the size given is too small for *C. aleyrodiformis*. He admits that the form Curtis figures is *C. aleyrodiformis*, while the form fitting to the size and antennæ, he says, is *C. lactea* Wesm. Curtis may not have been careful in counting the antennal joints, for it is not easy to be sure of their number, and the size as given by him may have been a misprint. But even if Curtis did have two species before him, surely the name must hold for that form which he figures, and to which figures he refers in both the specific and generic descriptions. This reference in the specific description to the figures makes the venation exhibited by the figures an integral part of the description, a part fully as important as the number of antennal joints or the size. Moreover, Tullgren, in a recent paper on the Swedish species, claims that the male of *lactea* Wesm. has 28 joints in the antennæ instead of 25, so that the differences in this respect between the two forms is less than was supposed by previous writers. There cannot be the faintest doubt as to what the figures of Curtis represent, and since he considered them typical of both genus and species, they must stand for *C. tineiformis*, rather than the doubtful supposition that Curtis had *C. lactea* before him, a form totally at variance with the figures.

* Brit. Entom., 1834, Plate 528 and text.

Enderlein^a has made a new genus, *Semidalis*, for *C. aleyrodiformis*, but, as I have shown, Curtis's own figures show that *C. tineiformis* has the same venation as *C. aleyrodiformis*; therefore *Semidalis* is a synonym of *Coniopteryx*. Wesmael described his species as *Malacomyza lactea*, and the genus is a good one. Fitch based his genus *Aleuronia* on a precisely similar form; therefore it is a synonym of *Malacomyza*.

SYNOPSIS OF GENERA.

1. Radial sector of fore wings simple; median vein with two branches; hind wings large and with two forks.....*Aleuropteryx*.
Radial sector of fore wings forked; median vein with but one branch2
2. In fore wings the cross-vein from cubitus runs into the lower branch of median vein (not into median itself); two forks in hind wings.
Coniopteryx.
In fore wings the cross-vein from cubitus runs into the median vein before the fork3
3. Hind wings very small and narrow, only one-half the length of fore wings; in hind wings the radial sector is not forked nor does it reach the margin*Conwentzia*.
Hind wings but little smaller than front pair.....4
4. In hind wings both the median vein and the radial sector are forked.
Parasemidalis.
In hind wings the radial sector is forked, but the median vein is simple*Malacomyza*.

Genus CONIOPTERYX Curtis.

Coniopteryx Curtis, Brit Ent., XI, tab. 528, 1834.

Coniortes Westwood, Introd. Mod. Class. Ins., II, p. 49, 1840.

Semidalis Enderlein, Wien Ent. Zeit., 1905, p. 197.

Head rather longer than broad, much smaller than the thorax; second joint of antennæ without tooth below in male; tibia of middle and hind legs slightly swollen in the middle. In the fore wings the radial sector is forked once, and likewise the median vein; the cross-vein from the cubitus connects to the lower branch of the median vein beyond the fork. The hind wings are about two thirds the size of the fore wings, and are similarly veined, showing two forked veins.

Type: C. tineiformis Curtis (fig. 9 of Curtis's plate).

***Coniopteryx vicina* Hagen (Pl. VI, fig. 5; Pl. VII, fig. 10).**

Head pale yellowish brown, vertex darker; antennæ pale yellowish, hairy, in female very slender, in male somewhat heavier, of about thirty joints (I think there is some variation). Thorax dark brown.

^a Wien. Ent. Zeit., 1905, p. 197.

Abdomen nearly black. Legs brown, mealy; the hind tibia plainly fusiform, one and one third times as long as femur; tarsi short. Wings dark, mealy (when not rubbed), the extreme outer margin of fore pair often pale. Venation as figured, the veinlet connecting subcosta and radius about its length or more beyond the veinlet closing discal cell; no cross-vein between first and second anal veins. In hind wings the venation is very similar to that of fore pair; the hind wings in both sexes reaching beyond discal cell of fore wing. The apical and posterior margins in both pairs are minutely ciliate. The abdomen of male is very short, and ends as in figure; in female it is nearly twice as long and swollen in the middle.

Length, 2.6-2.9 mm.

I have specimens from Sea Cliff and Hamburg, N. Y.; Lakehurst, N. J.; Plummers Island, Maryland, and Falls Church, Va. I have examined Hagen's type in the Museum of Comparative Zoology; it has outer margin of forewings pale; it is from Washington, D. C. This is our most common species.

Coniopteryx angustus, n. sp. (Pl. VII, fig. 8).

Very similar to *C. vicina*, but the fore wings are more elongate and slender, the apical margin not pale. Venation like *C. vicina*, except that the veinlet connecting subcosta and radius is fully three times its length beyond that closing the discal cell; and that the forks of the radial sector are longer. In the male the upper genital appendage tapers toward tip, while in *C. vicina* it is rather clavate.

Length, 3 mm.

Specimens from Claremont, Cal. (Baker), and Williams, Ariz. (Barber and Schwarz), U. S. N. M.

Genus PARASEMIDALIS Enderlein.

Parasemidalis Enderlein, Wein. Ent. Zeit., 1905, p. 197.

Similar in many respects to *Malacomyza*, but with rather larger front wings and more slender, while the hind wings have both the radial sector and the median vein forked, and reaching to the posterior margin.

Type: P. annæ Enderlein.

Parasemidalis flaviceps, n. sp. (Pl. VII, fig. 9).

Head yellow; antennæ yellowish, of about 38 joints; thorax and abdomen dark; legs brown, mealy; hind tibia slightly fusiform, not one fourth longer than femur, tarsi rather long, the basal joint longer than usual. Wings dark, mealy; venation as figured, the cross-vein connecting subcosta to radius is about twice its length beyond that closing the discal cell; the cross-vein from median to cubitus is oblique

(not transverse as in *Conwentzia* and *Malacomys*); a veinlet connecting cubitus and first anal present. In hind wings, which are long and slender, reaching beyond discal cell of fore wings, the venation is similar to that of the front pair, but the branch from the radial sector seems to be rather a branch from the median; margins of wings minutely ciliate.

Length, 3.6 mm.

Two specimens from Los Angeles, Cal.

Genus *CONWENTZIA* Enderlein.

Conwentzia Enderlein, Ber. West-preuss. Bot.-Zool. Ver., 1905, p. 10.

Head rather longer than broad, smaller than the thorax; antennæ simple; tibia of middle and hind legs swollen in middle. Fore wings rather long, both radial sector and median vein forked once; connecting veinlet from cubitus ends in the median before the fork of the latter; the hind wings are scarcely more than one-half as long as the fore pair, and less than one-half as broad, being rather strap-shaped; neither the radial sector nor the median vein is forked, and they do not reach the posterior margin of the wing.

Type: C. pineticola Enderlein.

Conwentzia hageni, n. sp. (Pl. VI, figs. 3, 4).

Head black; antennæ brown, of about 35 joints, more slender in female than in the male; thorax and abdomen brown, male abdomen very short, in female as long as hind wing; legs dark, hind tibia slightly fusiform, one fourth longer than femur, tarsi rather short. Wings pale, mealy; barely ciliate on margins, the cilia being extremely minute. Fore wings rather long, venation as figured, the cross-veinlet from radius to subcosta varies somewhat in position, as well as that from fork of radial sector to the upper branch of median. The hind wings are very short in both sexes, slender and strap-shaped; with but few veins barely reaching the margin.

Length, 3.6 to 4 mm.

I have specimens from Sea Cliff, N. Y.; Washington, D. C.; Falls Church, Va., and Aurora, W. Va., but it is not as common as *Coniopteryx vicina*.

Genus *ALEUROPTERYX* Löw.

Aleuropteryx Löw, Sitzungsab. Kais. Akad. Wiss. (Math. Natur. Cl.), xci (1), p. 79, 1885.

Head as broad as long, a little smaller than the thorax; antennæ of male with a tooth below on the second joint; tibia of middle and hind legs not swollen in the middle. In the front wings the radial sector is simple, and the median vein has two branches; the cross-vein

from the cubitus ends in the median much before the forking of the latter vein. The hind wings are but little shorter than the fore pair, and have both radial sector and median vein forked, and reaching the posterior margin.

Type: A. lowii Klapalek.

This genus was supposed by the author to be based on *A. lutea* Wallengren, but it has been shown that Löw's species was not the same. Enderlein has recently^a made a new genus—*Helicoconis*—for *A. lutea*, but the differences, in my opinion, are altogether too slight to be of generic importance; the exotic species he places in this genus probably represent two new genera.

***Aleuropteryx walshi*, n. sp. (Pl. VI, figs. 1, 2).**

Head yellowish; antennæ yellowish, short, of about 24 joints; thorax brownish; abdomen yellowish brown; legs brownish, hind tibia not swollen, tarsi long and slender. Wings pale, somewhat mealy (specimen partly rubbed), margins with long cilia, those on costal margin shorter than elsewhere. Wings with venation as figured, the cross-veins in groups, the cross-vein from subcosta to radius only a little beyond that closing discal cell; four basal cross-veins present; in the hind wings the radial sector arises near the base of wing and is forked before the oblique cross-vein closing the discal cell; the median and cubitus in basal half of wing run close together.

Length, 4.5 mm.

One specimen from Agricultural College, Mich., 3 July (Pettit Coll.). It appears to be more like *A. löwii* than like *A. lutea*.

Genus MALACOMYZA Wesmael.

Malacomyza Wesmael, Bul. Soc. Sci. Bruxelles, III, pp. 166, 214, 1836.

Sciodus Zetterstedt, Ins. Lapp., p. 1050, 1840.

Aleuronina Fitch, Nox. Ins. N. Y., 1, p. 97, 1856.

Head longer than broad, much smaller than the thorax; second joint of male antennæ simple; tibia of middle and hind legs slightly swollen in middle. Fore wings rather shorter than in the other forms, radial sector and median vein both with one fork, the connecting veinlet from the cubitus ends in median vein much before the fork of latter. In the hind wings, which are only a little shorter than the fore pair, the radial sector is forked, but the median vein is simple, and all the veins reach the margin.

Type: M. lactea Wesmael.

^a Zool. Anz., XXIX, p. 226, 1905.

7. *Malacomyza westwoodi*: fore wing.
 8. *Coniopteryx angustus*: male genitalia.
 9. *Parasemidalis flaviceps*: fore wing.
 10. *Coniopteryx vicina*: male genitalia.
 11. *Malacomyza farinosa*: fore wing.
-

In the discussion which followed Doctor Ashmead stated that he had found *Coniopteryx* feeding on a red spider (*Tetranychus*) on rose leaves. He had also found it eating aphides.

MAY 10, 1906.

The 205th regular meeting was held at the residence of Mr. O. Heidemann, 531 Randolph street, N. W., Petworth, D. C. Vice-president Hopkins occupied the chair and there were present Messrs. Busck, Caudell, Currie, Hopkins, Knab, Patten, and Piper, members, and Mr. Douglas H. Clemons, visitor.

Mr. W. W. Yothers, of the Bureau of Entomology, U. S. Department of Agriculture, was elected a corresponding member.

The Executive Committee reported that they had rented a room of the Security Storage Company, of Washington, D. C., for the storage of the publications of the Society.

Doctor Hopkins reported finding the larva of *Pissodes dubius* Rand. in balsam fir in New Hampshire, in the splintered portion of storm-broken trees. There was none of this species, however, in the trees which died of a root fungous disease. The work of *Dendroctonus piceaperda* Hopk. was found at altitudes above 2,000 feet, but none below. Old galleries were observed which must have been made some thirty or forty years ago.

Mr. Busck presented the following paper:

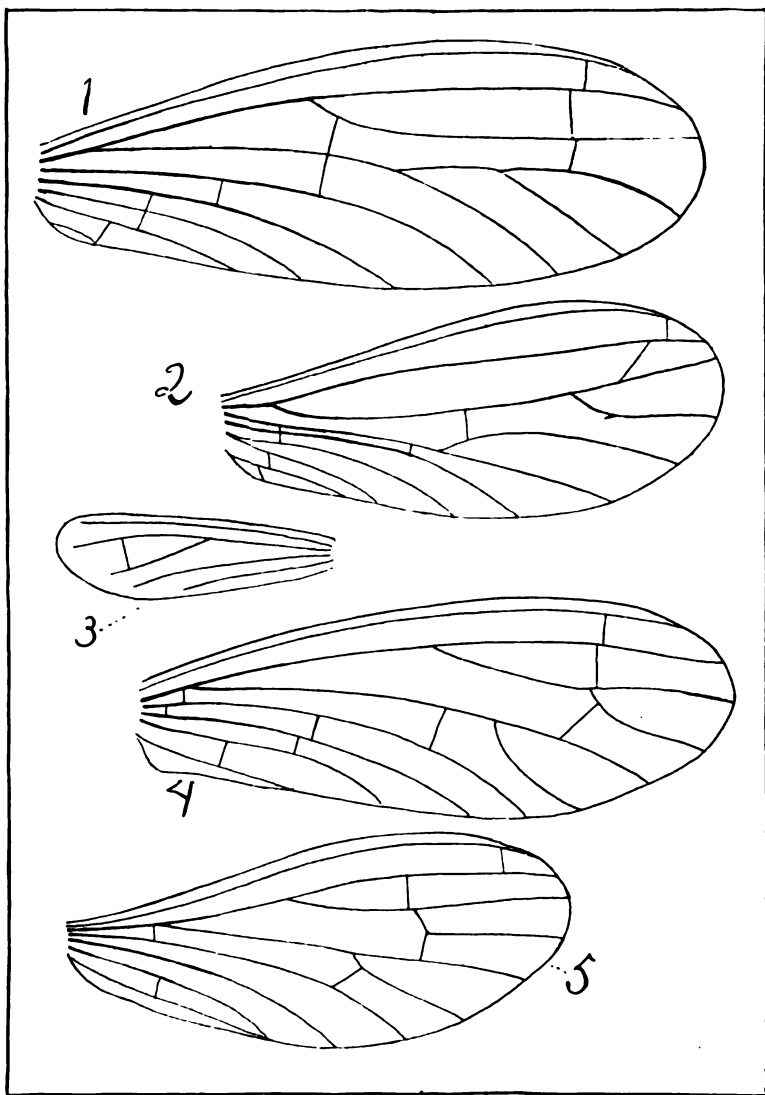
NEW AMERICAN TINEINA.

By AUGUST BUSCK.

Family YPONOMEUTIDÆ.

Choreutis schausiella, n. sp.

Antennæ blackish brown, checkered above with white, and with long ochreous cilia. Labial palpi dark brown, liberally sprinkled with white



NEARCTIC CONIOPTERYGIDAE.

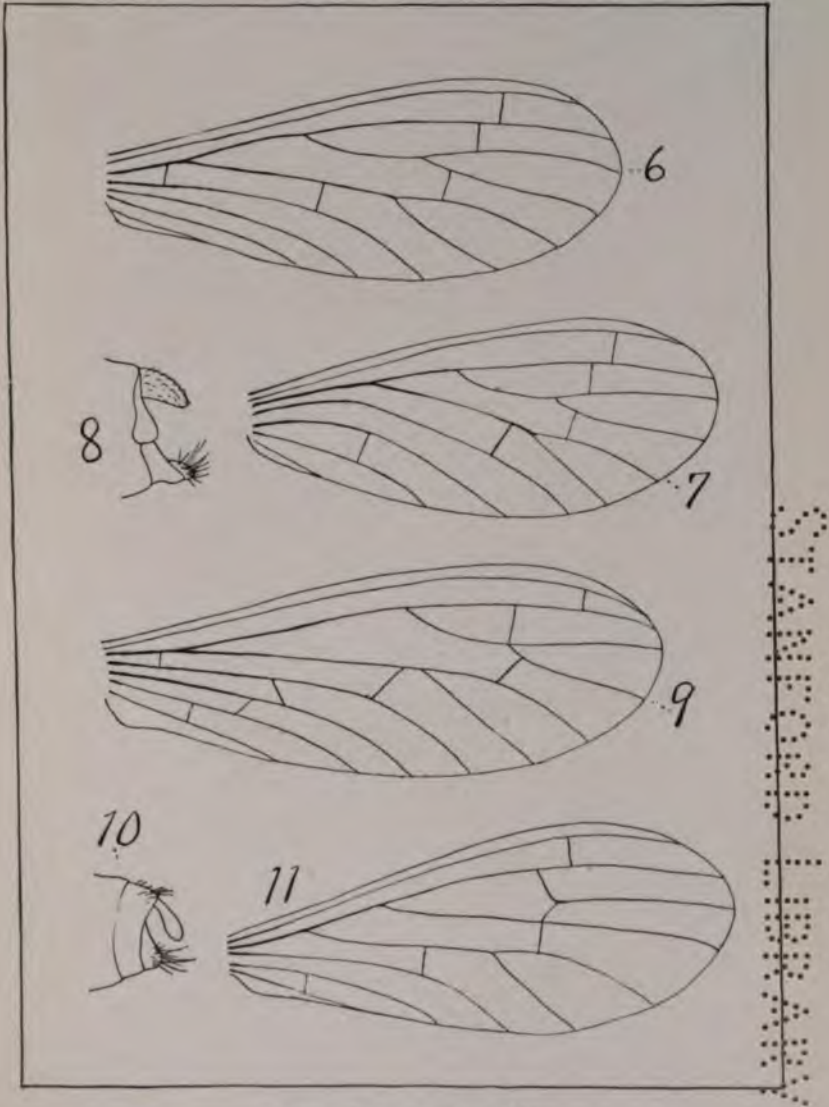
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NEARCTIC CONIOPTERYGIDAE.

2023

2023

scales on second joint and in the tuft; terminal joint dark. Head and thorax dark brown. Basal half of fore wings ochreous brown, very sparsely sprinkled with white scales; in this brown part is a narrow oblique fascia of bluish metallic scales from basal third of costa to the middle of the dorsal edge; this fascia is joined in the middle of the wing by another bluish metallic streak from the middle of costa and together they form a perfect though not very distinct Y. Just beyond the middle of the wing the basal unspeckled part is rather sharply terminated and the rest of the wing is profusely speckled with ochreous white. At tornus is a large, deep-black, elongate quadrangular spot, divided in the middle by a narrow perpendicular ochreous-brown line; the basal part of the spot contains a large center of bluish metallic scales, and the apical part contains a perpendicular line of such scales. The nearly unspeckled extreme apical part of the wing is rich olive-brown, with a thin line of bluish metallic scales along the edge of the wing from near costa to the tornal spot. Cilia dark olive-brown, dotted with white scales. Hind wings white, with tip and edges dark fuscous; cilia dark fuscous, with an indistinct whitish line parallel with the edge of the wing. Abdomen dark fuscous above, each joint tipped with lighter ochreous and silvery scales. Underside of body and legs profusely sprinkled with white scales; spurs white; tarsi annulated with ochreous white.

Alar expanse, 9.5–10 mm.

Las Vegas, New Mexico (Schaus).

Type.—No. 9888, U. S. National Museum.

Nearest *Choreutis occidentella* Dyar and very similar in ornamentation, differing in the smaller size, in the absence of the indistinct whitish fascia at basal third, and in the white hind wings. I have specimens of this species from Jalapa, Mexico, and from Mr. Schaus's collection. It gives me pleasure to dedicate this species to Mr. William Schaus, whose extensive collections of American Microlepidoptera, so liberally donated to the U. S. National Museum, will be subjects for study for a long time to come.

Pliniaca, n. gen.

Antennæ one-half times as long as the fore wings. Upper and anterior sides covered with scales, underside with a short pubescence; basal joint with pecten. Labial palpi short, ascending; second joint shortly tufted beneath; terminal joint pointed. Maxillary palpi obsolete. Tongue very long. Head roughened, face with loosely appressed scales. Fore wings three times as long as wide, obtusely pointed; 12 veins, all separate; vein 7 to termen; 2 and 3 distant; 3, 4, and 5 approximate; secondary cell bearing veins 8, 9, and 10; internal vein to between 6 and 7. 1 b furcate at base; membrane at costal edge between veins 9 and 12

thickened. Hind wings elongate-ovate, as wide as the fore wings; 8 veins, all separate; vein 2 distant from 3, which is omitted at corner of cell; veins 3, 4, 5, and 6 nearly equidistant, parallel; internal vein with one fork above 4 and one above 6. Posterior tibiae smooth.

Type: P. bakerella Busck.

The genus is not far removed from *Eucalantica* Busck.

***Pliniaca bakerella*, n. sp.**

Antennæ yellowish fuscous. Palpi, face, head, and thorax reddish ochreous, sprinkled with straw-yellow. Fore wings straw-yellow, suffused and streaked with reddish ochreous; the reddish color is aggregated along the basal half of costa, in a broad ill-defined longitudinal streak on the disc and along the dorsal edge; the outer third of the wing beyond the cell is irregularly and sparsely suffused with the same color. Cilia light straw-yellow. Hind wings dark fuscous. Abdomen and legs dark fuscous, sprinkled with straw-yellow.

Alar expanse, 19 mm.

Claremont, Cal. (C. F. Baker).

Type.—No. 9889, U. S. National Museum.

Named in honor of the collector, Mr. C. F. Baker, of the Estacion Agronomica, Santiago de las Vegas, Cuba, who has sent me this and the following species, besides several other interesting Microlepidoptera.

***Pliniaca sparsisquamella*, n. sp.**

Entire insect except the hind wings chalky white. Fore wings with large loosely attached scales; when at all rubbed the yellow skin of the wing gives the species the appearance of being oily. Hind wings rather dark fuscous. Legs and body immaculate white.

Alar expanse, 16-17 mm.

Claremont, Cal. (C. F. Baker).

Type.—No. 9890, U. S. National Museum.

This insect reminds one, in general habitus, of the genus *Tegeticula* Zeller [*Pronuba* Riley, nec Thomson].

Family GELECHIIDÆ.

***Paltodora pennella*, n. sp.**

Antennæ white, with sharp, black annulations. Labial palpi pure white, brush on second joint with a few black hairs interspersed. Face, head, and thorax pure white. Fore wings light ochreous, with the extreme costal edge and a narrow longitudinal streak on the fold white. From apical fifth of costa runs a faint oblique white streak across the

wing to termen; on the middle of the fold is a short longitudinal black streak, above this in the cell is a larger longitudinal streak, and at the end of the cell is a third very short black streak or dot. A few single black scales are sprinkled over the apical half of the wing along costal and dorsal edge. Cilia pure white, with base, tip, and two transverse lines black. Hind wing light ochreous fuscous. Abdomen ochreous. Anterior legs white, with a longitudinal black line through their entire length; posterior legs pure white, tarsi shaded with ochreous and with each joint tipped with black.

Alar expanse, 15 mm.

Bright Angel, Ariz. (H. S. Barber).

Type.—No. 9891, U. S. National Museum.

The species is closest to *Paltodora magnella* Busck, but smaller, brighter ochreous in color, and without the costo-apical white dashes. The peculiar ornamentation of the fore legs makes easy the distinction of this species from all described American species of the genus except *dietriella* Busck, which has a similar ornamentation not mentioned in the description. The wing color and markings, however, separate it from this rather dark ochreous species.

***Sophronia primella*, n. sp.**

Antennæ shining dark brown, without color annulations. Labial palpi whitish, mottled with ochreous fuscous, especially on the exterior side and in the large well-developed brush. Face whitish. Head and thorax whitish ochreous, strongly mottled with dark ochreous and fuscous scales. Fore wings ochreous, mottled and longitudinally streaked with white, black, and fuscous. Costal edge from base to apical third white, edged below by a narrow streak strongly mottled with fuscous. Below it is a nearly unmottled area of clear ochreous, reaching to the middle of the wing and only transversed by a single dark line on the subcostal vein. From base through the center of the wing run close beside each other two parallel black lines, interrupted at the end of the cell by a round brown dot, but continued on the other side nearly to a small round black dot at apex. The dorsal part of the wing is rather freely dusted with white and brown scales and on the middle of the fold is an oblong brown dot. Cilia long, white, with two dark lines parallel with the edge of the wing and with a long thin deep black pencil at apex, which is slightly falcate. Hind wings light ochreous fuscous; cilia light ochreous. Abdomen dark fuscous. Legs ochreous, tarsi annulated with black.

Alar expanse, 17 mm.

Arizona, Colorado, Texas(?).

Type.—No. 9892, U. S. National Museum.

This is the first record in America of this interesting European genus. I have been unable to examine the type of the genus *Illustrella* Hübner, but presume that the other species placed with it in this genus by Rebel are truly congeneric, and the present American species has the same general habitus and the identical oral and venational characters as these. The venation is as follows: Fore wings, 12 veins, 7 and 8 stalked to costa, rest separate; hind wings, 8 veins, 3 and 4 closely approximate or connate (in *primera* approximate), 5 nearest 4, 6 and 7 stalked.

I have long had the type of this species, but have been in doubt about its locality label, which reads: "From Boll, Texas." Such labels were placed, during a short period, on Microlepidoptera from any locality by a young inexperienced worker in the Department of Agriculture and are consequently not dependable. Some European specimens, for example, bear such a label. I have, however, examined and determined specimens from Cochise County, Ariz., and from Denver, Colo., for my friend, Doctor W. G. Dietz, and have thus at least two good localities for the species.

I have met with another species of this genus, collected in New Jersey, but have not sufficient material to properly describe it at present.

***Telphusa velatella*, n. sp.**

Antennæ silvery white, with black annulations. Second joint of labial palpi white, speckled and barred with black; terminal joint white, with two ill-defined black annulations, one around the middle and one just before the tip; brush short, divided. Face iridescent white. Head and thorax white, sprinkled with dark fuscous scales. Fore wings clothed with very long, narrow speckled scales; ground color white, heavily overlaid with ochreous and fuscous on the basal two thirds of the wing; the apical third is also sprinkled with dark scales, but to a less extent and appears quite light contrasted with the basal part. Near base is an oblique, outwardly directed, black costal streak, reaching the fold and followed by a white space only slightly sprinkled with dark scales. There are two longitudinal rows of tufts of raised scales, one through the middle of the wing with the first tuft at basal third, the second on the middle of the wing, and the third at the end of the cell; the other row with two tufts below the fold and the third just below the end of the cell. Hind wings light fuscous. Legs white, barred with black; tarsi black, each joint tipped with white.

Alar expanse, 14 mm.

Williams, Ariz., July (H. S. Barber).

Type.—No. 9893, U. S. National Museum.

Intermediate in coloration between *Telphusa basifasciella* Zeller and *T. belangerella* Chambers, but distinguished from both by the presence of the tufts of raised scales.

***Gelechia triangulella*, n. sp.**

Antennæ purplish fuscous, with black annulations. Second joint of labial palpi iridescent roseate white, sparsely dusted with dark fuscous especially on the brush, which is short and divided, longest at base and tapering towards apex; terminal joint blackish fuscous. Face pale fuscous, strongly iridescent. Head and thorax dark fuscous. Fore wings with light fuscous ground color heavily overlaid with dark fuscous scales, and with a roseate tinge. On the middle of the cell is a blackish triangular spot with one point touching the fold and preceded basally by a few ochreous scales; at the end of the cell is a similar blackish triangular spot; the edges of both spots are faintly continued to the costal edge. Apical third of the wing heavily overlaid with blackish scales. Cilia roseate, sprinkled with black scales. Hind wings light silvery fuscous; veins 6 and 7 nearly parallel, veins 3 and 4 short-stalked. Abdomen ochreous-fuscous. Legs ochreous, mottled on their outer sides with black scales.

Alar expanse, 12–13 mm.

Bright Angel and Williams, Ariz., June and July (H. S. Barber).

Type.—No. 9894, U. S. National Museum.

This is a rather inconspicuous dark species, not very near to any described American species, but probably most easily placed with the few other roseate species, from which it is easily separated by the two large triangular discal markings.

One specimen bears Mr. Barber's label, "common in rats' nest."

***Gelechia kincaidella*, n. sp.**

Antennæ unicolor, dark fuscous. Labial palpi light ochreous, with base of second joint brown and with outer side and tip of apical joint slightly shaded with brown; brush on second joint well developed, but not divided, largest at base, gradually shorter towards apex. Face whitish ochreous. Head and thorax whitish-ochreous, patagia dark brown. Fore wings light ochreous, with a slight tendency toward reddish in the apical part. Costal base, a large semicircular costal spot before the middle of the wing, and a large discal spot at the end of the cell dark brown, with the light ground color as narrow channels between the spots. The large brown spot at the end of the cell is

irregularly pentagonal, with the longest and sharpest point towards apex and with the upper corner touching the costal edge. The apical and terminal edges of the wing are strongly dusted with black and brown scales. Hind wings dark fuscous. Abdomen and legs ochreous. Venation typical.

Alar expanse, 23 mm.

Rock Spring, Wyo. (T. Kincaid).

Type.—No. 9895, U. S. National Museum.

This large handsome species is most nearly allied to *Gelechia paulella* and *G. aristella*, but not mistakable for either. It gives me pleasure to dedicate it to the collector.

***Paralechia californica*, n. sp.**

Antennæ white, with narrow black annulations. Labial palpi silvery white; second joint with a small black dot exteriorly; terminal joint with a black annulation near base and one near the apex; brush well developed, pure white. Face and head silvery white. Thorax white, tipped posteriorly with black. Fore wings silvery white, with extreme base of costa black and with three ochreous oblique costal streaks edged with black, one of which is rather indistinct near the base, another on the middle of the wing more pronounced, and one at apical third; these streaks terminate at about the middle of the wing, except the last, which runs across the wing. There are six conspicuous tufts of raised black scales in two longitudinal rows on the middle of the wing. Dorsal part of the wing pure white, apical overlaid with ochreous and black scales; the interval between it and the last costal streak appears as a narrow angulated white fascia. Hind wings light fuscous, cilia yellowish. Abdomen and legs white; tarsal joints annulated with black.

Alar expanse, 15 mm.

Los Angeles, Cal. (D. W. Coquillett).

Type.—No. 9896, U. S. National Museum.

A striking species, which reminds one of *Mompha eloisella* Clemens, but which can not be confused with any described American gelechiid.

***Trichotaphe barnesiella*, n. sp.**

Antennæ purplish black, shortly ciliated. Second joint of labial palpi dark purplish fuscous, terminal joint ochreous. Head blackish brown, with purplish reflections; face somewhat lighter, iridescent. Thorax blackish brown, patagia light creamy yellow. Fore wings with costal half light creamy yellow in striking contrast to the dorsal half, which is purplish brown; the two colors are sharply divided in the middle of the wing; the yellow costal part which reaches nearly but not quite

to apex has two slight serrations projecting into the dark dorsal part. Cilia blackish. Hind wings dark fuscous. Abdomen dark fuscous, in the female with protruding hairy horny ovipositor. Legs black exteriorly, ochreous on the inner side.

Alar expanse, 17 mm.

Redington, Ariz.

Type.—No. 9897, U. S. National Museum. Cotypes in Dr. Wm. Barnes's collection.

Named in honor of Dr. Wm. Barnes, of Decatur, Ill., to whom I am under obligations for this and many other interesting Microlepidoptera. This striking species is very similar to *Trichotaphe serrativitella* Zeller and has nearly the identical pattern and coloration of the fore wings, but it is at once distinguished from this eastern species by its dark head and palpi.

Family STENOMIDÆ.

Stenoma mistrella, n. sp.

Antennæ in the male strongly ciliate, in the female simple; dark purplish fuscous. Labial palpi long, recurved, smooth, light ochreous gray; underside of second joint slightly thickened with somewhat darker scales. Face, head, and thorax light ochreous gray. Fore wings light ochreous minutely speckled and overlaid with darker brown scales; at the end of the cell is a small but conspicuous round black dot; cilia light ochreous; the costal edge is nearly straight and apex is pointed; venation typical with 12 separate veins, 7 to termen. Hind wings with 8 veins, 6 and 7 stalked, 3 and 4 connate, 5 approximate to 4; dark fuscous. Abdomen dark fuscous. Anterior legs blackish in front; legs otherwise smoky ochreous.

Alar expanse, 20–23 mm.

St. Louis, Mo. Described from five specimens collected by Mr. H. McEhlose and by the writer in September, 1904.

Type.—No. 10708, U. S. National Museum.

The present genus and *Brachyloma*, Clemens (Ide, Chambers) do not belong to the family Xyloryctidæ as tentatively placed in Doctor Dyar's Catalogue, but form a separate family to which Mr. Meyrick has given the name Stenomidæ. This family is the predominating one among the Microlepidoptera of South America.

Family ŒCOPHORIDÆ.

Ethmia macelhosiella, n. sp.

Antennæ blackish brown. Second joint of labial palpi black, with white base; terminal joint white, mottled posteriorly with black scales.

Face black. Head white, with a black dot on vertex. Thorax white, with black longitudinal central line. Patagia white, with black bases and tips. Fore wings white, more or less overlaid with fuscous; from base to apex is a deep black longitudinal central streak; the costal part of the wing above this streak is somewhat darker than the dorsal part. The streak is interrupted, though not entirely broken, at the end of the cell by a pure white dash and it is edged dorsally from base to beyond the middle by a narrow longitudinal interrupted line of bright orange scales. A few black scales are scattered over the light portion of the wing and tend in the apical part to form narrow longitudinal streaks. Along the dorsal edge is a row of black dots before the cilia, which are white. Hind wings light fuscous. Abdomen dark fuscous. Legs black with white annulations.

Alar expanse, 27 mm.

St. Louis, Mo. (H. A. McElhose).

Type.—No. 9898, U. S. National Museum.

Named in honor of the collector, my friend, Mr. H. A. McElhose, who has sent me this and other interesting Microlepidoptera. The species is nearest *Ethmia subcærulea* Walsingham, but at once distinguished from this and all described American species of the genus by the prominent central longitudinal black streak.

***Ethmia umbrimarginella*, n. sp.**

Antennæ deep purplish black. Labial palpi black; rather more weakly developed than is typical of the genus and with long spreading brush of thin black hairs on the second joint. Tongue coiled, black. Face, head, and thorax deep black. Fore wings dark mouse-gray, with white costal edge and a central longitudinal streak of bright reddish orange from base to near the end of the cell. At the end of the cell is a large oblong deep black spot divided in the middle by a transverse, bright orange dash. On the middle of the wing just above the longitudinal orange streak is a small round deep black dot and preceding it below the orange streak is a larger round black dot. Between this last dot and the base of the wing is a short longitudinal black streak edging the orange. Cilia gray. Hind wings chalky white, with a broad dark gray border all around the edge, cilia gray. Abdomen blackish brown. Legs unicolored dark brown.

Alar expanse, 20 mm.

Las Cruces, New Mexico (T. D. A. Cockerell). Professor Cockerell informs me that the species was taken February 22 on canaigre (*Rumex hymenosepalus*) in Mesilla Park.

Type.—No. 9899, U. S. National Museum.

This and the following species belong to the group of the genus *Ethmia* which is represented by the European *pyrausta* Pallas. The species of this group, which probably should be given generic rank, differ from the typical species of *Ethmia* in the scantier, more hair-like scaling and in the somewhat shorter and weaker labial palpi, which are not smooth as in the typical forms, but covered with a more or less strongly developed brush of thin hairs on the under side of second joint.

None of the hitherto described American species belongs in this group. The present species is nearest the European *auriflua* Hübner, but differs in the unicolored abdomen and in the presence of the orange ornamentation of the fore wings. This and the following species are at once distinguished from all American and European species by their striking white, dark-bordered hind wings.

***Ethmia coquillettella*, n. sp.**

Antennæ purplish black. Labial palpi black, with base of both joints white; second joint with short rough brush beneath. Lower part of face and the region below the eyes white; vertex black. Thorax dark brown; tips of patagia white. Fore wings mouse-gray, somewhat lighter than in the preceding species; at base is an inconspicuous light-yellow spot edged exteriorly with black. Just outside it is a longitudinal deep black dot on the fold and on the middle of the fold is another similar dot. On the middle of the wing is a third similar black dot and at the end of the cell is a fourth somewhat larger black spot, divided in the middle by a large round white or very pale yellow dot. Cilia concolorous with the wing. Under side of fore wing dark gray, with the white second discal spot prominently shining through. Hind wings clear pearly white, with a broad dark gray border on apical and tornal edges but not on costa nor on the base of the dorsal edge. Abdomen above dark fuscous, with bright ochreous anal segment; under side with each joint tipped with white. Legs black, sprinkled with silvery-white scales; tarsal joints tipped with white.

Alar expanse, 15 mm.

Los Angeles, Cal. (D. W. Coquillett).

Type.—No. 9900, U. S. National Museum.

This species is nearest to the foregoing, but much smaller and differs otherwise in the shorter brush on the labial palpi, in the absence of the yellow discal streak on the fore wing, by the incomplete dark border on the hind wings, and by the ornamented abdomen and legs. Named in honor of the collector, who has added many interesting species of Microlepidoptera to the Museum collection.

Family ELACHISTIDÆ.

Mompha pecosella, n. sp.

Antennæ dark fuscous, with narrow black annulations. Labial palpi white; second joint thickly sprinkled with black scales, especially on the exterior side; terminal joint with two black annulations, one near base, the other just before apex. Face iridescent, white. Head white, sprinkled with dark fuscous scales. Thorax dark fuscous. Fore wings blackish brown, irregularly and sparsely sprinkled with white scales and indistinctly streaked with lighter brown longitudinal lines. From costal base runs an outwardly oblique ridge of raised scales across the wing; the basal portion of the wing, limited by this ridge, is strongly mottled with white scales; just before the middle of the costa begins another oblique ridge of raised scales, parallel with the first, but not so complete, consisting of small separate tufts, of which the largest is on the fold. Below the end of the cell is a large tuft of raised scales, surrounded by scattered white scales. Hind wings dark fuscous. Abdomen fuscous above, ochreous on the under side. Legs blackish, sprinkled with ochreous.

Alar expanse, 12-13 mm.

Pecos, New Mexico, June (T. D. A. Cockerell).

Type.—No. 9901, U. S. National Museum.

This species is quite close to *Mompha murtfeldtella* Chambers, but it is smaller and the basal part of the fore wings is mottled, not pure white as in *murtfeldtella*; the light colored thorax also distinguishes that species from the present. With wings folded this insect looks like a *Recurvaria*.

Mompha iridella, n. sp.

Antennæ dark brown, with indistinct silvery white annulations. Labial palpi white, terminal joint shaded in front and at apex with golden fuscous. Head and face white. Thorax fuscous, iridescent. Fore wings light golden brown, overlaid with iridescent white and blue scales. A triangular spot near base of costa, another on the middle of costa, and a third larger costal spot between the latter and apex silvery white; the two last costal spots are edged exteriorly with blackish scales. Between the fold and the dorsal edge are two or three small tufts of erect iridescent scales; similar small tufts are found on the middle of the wing and one at the end of the cell; just below the latter is a larger dark brown iridescent scale tuft. Tip of apical cilia white, cilia otherwise light yellowish fuscous. Hind wings dark bronzy fuscous, cilia a shade lighter. Abdomen bronzy fuscous. Legs whitish, barred exteriorly with fuscous.

Alar expanse, 13-14 mm.

Claremont, Cal. (C. F. Baker).

Type.—No. 9902, U. S. National Museum.

This is a brilliant little moth of iridescent golden and silvery scales, nearest to *Mompha sexnotella* Chambers. Venation and oral characters typical.

Family TINEIDÆ.

Marmara opuntiella, n. sp.

Face and head silvery white. Antennæ fuscous. Labial palpi white, with apex of second joint and a ring around terminal joint black. Maxillary palpi yellowish. Thorax and fore wings yellowish fuscous mottled with black; at basal third of fore wing is a narrow straight transverse white fascia, edged basally with black; at the middle of the wing is a similar slightly oblique white fascia and at apical third are a costal and an opposite dorsal white spot nearly reaching each other; just before apex is a white costal spot. Hind wings dark fuscous. Abdomen fuscous, with ochreous anal appendages. Legs white, with black annulations.

Alar expanse, 7-8 mm.

Southern Texas. Foodplant, *Opuntia* sp.

Type.—No. 9903, U. S. National Museum.

Bred by Mr. E. S. G. Titus in the Insectary of the U. S. Department of Agriculture from an *Opuntia* received during the winter of 1904-5. The larva mines just under the epidermis, making a long winding serpentine mine sometimes widened out into irregular blotches. The larva, like those of the other species of the genus, is footless, much flattened and incised between the joints while in the mine. At the last larval molt it assumes the cylindrical form with normal legs and spins the characteristic cocoon with the peculiar globular ornamentations, as do the other species of the genus.

Ectoedemia, n. gen.

Head and face tufted. Antennæ 3, simple in both sexes, rather thick; basal joint concave and dilated to form a small, strongly scaled eye-cap. Labial palpi well developed, porrected. Maxillary palpi long, folded. Tongue obsolete. Fore wings elongate-ovate, pointed, thickly clothed with scales; 8 veins, veins 3, 4, 5, and 9 absent; cell very short, closed; 6 to termen; 7 and 8 stalked to costa, with stalk out of 6; 1b simple at base. Hind wings nearly as long and $\frac{3}{4}$ as wide as fore wings, elongate-ovate, pointed; 5 veins, veins 3, 4, and 5 absent; cell open between 2 and 6; 6 and 7 stalked from basal fourth of the wing, diverging widely, one running along costal and one along dorsal edge

of the wing and approaching each other at apex; vein 2 simple; vein 1c perceptible. Posterior tibiæ clothed with stiff hairs above; middle spurs near but below middle of tibia.

The genus is very close to *Nepticula* Zeller, but that homogeneous genus of leaf-mining moths will not allow the gall-making *populella* within its limits. The main structural differences which separate *Ectoedemia* are the smaller eye-cap, the somewhat more strongly developed labial palpi, the closed cell in the fore wings, and the spurs on the posterior tibiæ—which are situated near but below the middle. I am pleased that my views coincide with those of Dr. Edw. Meyrick, to whom I showed specimens while at his home in Marlborough.

Type: E. populella, n. sp.

***Ectoedemia populella*, n. sp.**

Antennæ dark cupreous brown, basal joint forming a small eye-cap enlarged by heavy light yellow scaling. Face and head reddish ochreous. Thorax dark brown. Fore wings unicolored shining dark cupreous brown, with strong green and violet iridescence according to the light. Hind wings lighter cupreous brown, with ochreous cilia. Abdomen shining dark fuscous. Legs ochreous-fuscous with a bluish metallic sheen.

Alar expanse, 7–8.5 mm.

Massachusetts; New Hampshire. Food plant, *Populus*.

Type.—No. 9904, U. S. National Museum.

Described from a very large series of moths bred in the insectary of the U. S. Department of Agriculture from galls on the petiole of leaves of poplar received in September, 1884, from Miss C. H. Clarke, Jamaica Plains, Mass., and from A. Koebele at Holderness, N. H. The following are extracts from Mr. Theo. Pergande's notes on the species:

Each gall contains a single larva, which when mature is 8 mm. long and pale yellow, with pale brown head, mandibles darker, and posterior margin of anal shield brown. Legs only rudimentary and can be entirely withdrawn from view.

The gall is almost globular, of about the size of a pea, and is a swelling of the petiole close to the leaf; it is somewhat rugose longitudinally and of a grayish color. The course of the petiole is generally very distinct along its upper side, being smooth and of a reddish-brown or yellowish color. The cavity is more or less irregular on account of the woody fibers, which run through the walls of the gall and which are not eaten by the larva. Late in October the larvæ left

the galls and descended about $\frac{1}{4}$ inch into the ground in the cage, where they spun small brown, flat, oval cocoons, resembling in shape very much those of the *Nepticula* on apple. The moths issued during May of the following year.

***Neolophus punctellus*, n. sp.**

Antennæ simple in both sexes, thick, with closely set whorls of short scales which give an appearance of serration; ochreous gray. Labial palpi in the males long, slightly recurved, reaching vertex, closely appressed to the face; in the females much shorter, porrected, terminal joint deflected. The palpi are slightly lighter than the head and thorax, which are covered with light fuscous white-tipped scales; thorax smooth. Fore wings appear pearly, light, whitish fuscous, irregularly and sparsely dotted with black scales; under a lens it is seen that the scales are of different shades of brown, each tipped with very light, nearly white, slate-color, except the few deep black ones, which are slightly metallic. Cilia blackish brown. Venation normal, with 12 veins, 7 to termen just below apex, 8 and 9 stalked, 1b furcate at base. Hind wings ochreous brown, with 8 veins, all separate; 3, 4, 5, 6, and 7 nearly equidistant and parallel from the end of the cell; a forked discal vein to vein 4 and to just below vein 6. Abdomen dark fuscous above. Under side of body whitish. Legs whitish, sprinkled with fuscous; tarsal joints dark brown, tipped with white.

Alar expanse, ♂, 19 mm.; ♀, 24 mm.

Hot Springs, Ariz., (E. A. Schwarz); Las Cruces, New Mexico (T. D. A. Cockerell).

Type.—No. 9905, U. S. National Museum.

A pretty species, which can not be confounded with any other American anaphorid, and is easily recognized by the pearly-black dusted fore wings.

—Doctor Hopkins remarked on the genera and species of beetles in this country, particularly in the West, which are very closely allied or identical to European forms.

—Doctor Hopkins reported, also, on the work of the buprestid beetle *Agilus bilineatus* Web. in oak defoliated by the gipsy moth (*Porthetria dispar* L.), in Massachusetts.

—Mr. Knab presented some notes on the habits of the larva of *Sayomyia punctipennis* Say, a dipterous insect of the family Corethridæ, allied to the mosquitoes. In the discussion which followed, remarks were made on the habits of the larvæ of

Sayomyia by Messrs. Currie and Busck and on those of Megarhinus, a culicid, by Doctor Hopkins.

—The concluding paper was by Mr. Heidemann and entitled "A Preliminary Account of New North American Tingitidæ." Several new species of these "lace bugs" were described and interesting notes presented on the habits of some of them. Many of the forms were exhibited before the Society, with specimens of leaves showing their manner of oviposition.

JUNE 7, 1906.

The 206th regular meeting was held at the Sængerbund Hall, 314 C street, N. W., the Society being there entertained by Mr. E. A. Schwarz. In the absence of the president and both vice-presidents the meeting was called to order by the treasurer, Mr. Patten, and Mr. Schwarz was elected president pro tem. The following persons were present: Messrs. Ashmead, Barber, Barrett, Busck, Condit, Currie, Davis, Heidemann, Knab, Lawford, Morris, Schwarz, Stiles, and Ulke, members, and Messrs. Douglas H. Clemons and William G. Dietz, visitors. The minutes of the April and May meetings were read and approved and reports were presented by the treasurer and by the publication and executive committees.

Dr. A. Fenyes, of Pasadena, Cal., and Mr. F. H. Mosher, of New Bedford, Mass., were elected corresponding members.

By vote of the Society Doctor Howard was requested to act as a delegate from the Entomological Society of Washington to the meeting of entomologists to be held at Ithaca, N. Y.—in connection with the summer meeting of the American Association for the Advancement of Science—for the purpose of organizing a society of American entomologists.

The chairman referred to the overwhelming disaster that had fallen upon the city of San Francisco from the earthquake and resulting fire and spoke of the almost complete losses of books and specimens sustained by the California Academy of Sciences and by Mr. Charles Fuchs, the custodian of the insect collections of that institution. It was thereupon moved and seconded that the Society aid in the restoration of the library of the California Academy of Sciences and of the personal library of Mr. Fuchs

by donating to each a complete set of the Proceedings of the Entomological Society of Washington. These sets, the chairman stated, would be forwarded free of expense to the Society by the Smithsonian Institution.

Doctor Ashmead exhibited the worker of a curious ant collected by Mr. O. F. Cook in Guatemala, *Strumigenys mandibularis* Smith, a cryptocerine. Little is known of the habits of these small ants, but some of them live in galleries in twigs and it is not improbable that they are fungi feeders. Mr. Schwarz stated that the species of *Strumigenys* found in Guatemala lives among old leaves on the ground and that the twig-inhabiting species belong to the genus *Cryptocerus*. One species of *Strumigenys* occurs near Washington, in the vicinity of Bladensburg, Md., among old leaves and in very small colonies, some 5 or 6 individuals only being found together. They may be collected by sifting.

—Doctor Stiles reported the occurrence of the tick *Derma-centor nitens* Neumann in this country. Mr. Hunter recently sent to Washington specimens from Texas. This species has heretofore been reported from Porto Rico and South America. It occurs on horses. Mr. Schwarz remarked that if this species were native to Porto Rico or the West Indies it must have had some other host than horses originally, since the horse is not native there. He asked Doctor Stiles whether this tick had been found on any other animal, and Doctor Stiles replied that it had not. Doctor Stiles stated further that while a single species of ticks might be taken on several different species of animals, yet in the well studied forms it would appear that there is a decided predilection for some one host species. Mr. Schwarz stated that a man-attacking species of tick was very common in Alta Vera Paz, Guatemala, and Doctor Stiles then said that this was in all probability *Ornithodoros megnini* Dugès.

—Mr. Barber reported having captured a specimen of *Mantispa brunnea* Say, a neuropteroid insect, at Jacksons Island, in the Potomac River not far below Great Falls, Maryland. Although this species is recorded from New Jersey and Philadelphia as well as from the Southern States, in its eastern range,

it has never before been taken, judging from the absence of confirmatory records, in the vicinity of Washington. When he first observed it in flight Mr. Barber mistook it for a wasp of the genus *Polistes*. The specimen was exhibited.

—Mr. Barber showed also a specimen of *Flebotomus*, new species, a small fly belonging to the family Psychodidæ, from Guatemala, where he found it extremely annoying from its bite, which was quite severe. According to Mr. Coquillett this genus has not before been reported except from southern Europe and Africa. Mr. Barrett said he believed he had seen the same fly in the southern part of the State of Vera Cruz, in Mexico, where it was known as “chaquista.” If this were the same insect he could testify to the severity of its bite.

—Mr. Knab spoke of the paper published by Doctor Dyar and himself on the classification of the Culicidæ by larval characters.* The paper had been adversely criticized, particularly because a number of new species were based solely upon larval characters. While this proceeding might cause temporary inconvenience to systematists it nevertheless seemed to the authors the only method of expressing the great importance of the larval characters, not only in the separation of species otherwise hardly distinguishable, but above all in putting the classification upon a more natural basis. Systematic workers on the Culicidæ have wholly neglected the study of the early stages and have based their classification largely upon superficial and unimportant characters. Many of the genera are unnatural and often composite, formed of species brought together upon superficial resemblance but in no wise related. Doctor Dyar's work upon the early stages of the Lepidoptera and its influence upon the classification of that order is so well known that similar work of his in other groups is bound to command respect. Under the circumstances the following post-card, received from Baron von Osten Sacken by Doctor Dyar, is of interest as coming from a man who can see beyond the inevitable shortcomings.

* The larvæ of Culicidæ classified as independent organisms. By Harrison G. Dyar and Frederick Knab. Journ. N. Y. Ent. Soc., Vol. xiv, pp. 169-230, Plates iv-xvi, 1906. (Separates issued March 15, 1906.)

HEIDELBERG, GERMANY, May 4, 1906.

My Dear Sir: I had the pleasure to receive your paper, "The larvæ of Culicidæ classified as independent organisms." When I first began the study of N. Am. Diptera, in 1856, I never dreamed that within half a century this study would reach a degree of progress and perfection as your paper shows it to be the case!

Very sincerely yours,

C. R. O. S.

Mr. Knab then requested Doctor Stiles to state the ruling adopted by the International Zoological Congress with reference to species based upon larval characters.

In reply Doctor Stiles said that there were two standpoints from which to look at this question. The first was that of nomenclature and from this standpoint he thought the practice of describing species from other than the adult forms was perfectly allowable. Numerous species in different groups of the animal kingdom have been described from some immature stage and the descriptions and names under which they were published have since been recognized as valid. From the standpoint of classification the question was, however, one of feasibility. In many cases the descriptions of immature stages are of great value. As an instance, the descriptions of the eggs of cestodes and nematodes are very important in clinical diagnoses, and clinical determinations are in these groups made on the egg nine times out of ten.

Mr. Morris said that it was customary among botanists, especially among students of fungi, to recognize the earliest name given to a plant regardless of what stage formed the basis of the description; and in publications these names were followed by Roman numerals to indicate which stage was described.

Mr. Schwarz alluded to the recognition of descriptions of the work of insects, as galls, etc. He asked Doctor Stiles whether species based on the description of the structure and form of the excrement should be considered valid. Doctor Stiles replied that fossils described on the structure of the excreta or of prints were accepted and he saw no reason why the same rule should not apply to other animals.

—Mr. Schwarz presented an informal paper entitled "Notes on Guatemala." He stated, by way of introduction, that Mr. Barber and he had recently returned from a short trip to Guatemala for the U. S. Department of Agriculture, most of their time being spent in the province of Alta Vera Paz. Guatemala has been more written about than any other Central American country. Doctor Sapper spent twelve or thirteen years in Alta Vera Paz and has written a most interesting book concerning the region. The entire country made up of British Honduras, Costa Rica, Yucatan, and Panama is one solid tropical forest. The plateau region of Guatemala, of which Alta Vera Paz is a part, is drier than the country of the lower levels and bears some resemblance to the plateau regions of Mexico and the United States. One peculiarity of Guatemala, however, is that the mountain ranges run from east to west. There are three of these ranges, of which the southernmost is the highest. Some of the peaks are 12,000 or 13,000 feet high and have never been scaled.

Regarding cotton raising in Alta Vera Paz and the cotton-protecting ant or kelep (*Ectatomma tuberculatum* Oliv.) Mr. Schwarz stated that there was no wild cotton plant in that country, but some remarkable varieties of cotton are cultivated there which need no protection whatever from the cotton boll weevil (*Anthonomus grandis* Boh.). In Guatemala cotton is grown continuously and there is no intermittent season as in the United States. The arborescent cotton found there is not native and it reproduces throughout the year as do the other forms of cotton. On this arborescent cotton the boll weevils multiply and it is this cotton which needs protection from these insects. In regard to the kelep colonies, some of them are insectivorous and others not. Those which are insectivorous will eat any insect which occurs on the cotton, and do not confine themselves to boll weevils.

The amount of rainfall in Guatemala is astonishing, and this accounts largely for the immense forests. There is a scarcity of roads and clearings and this makes collecting difficult, as it is almost impossible to penetrate the tropical jungle.

Large numbers of brilliant butterflies are to be seen in the

clearings, but other insects must be searched for, and to secure them great labor is required. The diurnal Lepidoptera from that country are well known; the Heterocera, on the other hand, are very rarely seen and appear to be very scarce. The families of Coleoptera which are well represented are the Chrysomelidæ, the Cerambycidæ, and the Curculionidæ. Of these, the Chrysomelidæ are conspicuous and very numerous, both in species and individuals. The Cerambycidæ, although well represented, are not conspicuous and must be searched for. The Curculionidæ, also, are not obvious, but are nevertheless well represented. There appear to be no large bright colored Diptera. Some Tipulidæ mimic hymenopterous parasites and are quite conspicuous. Man-attacking Diptera are very abundant, and are represented by black flies (*Simulium*), sand flies, mosquitoes, Tabanidæ, Hippelates, and the psychodid *Flebotomus* exhibited earlier in the meeting by Mr. Barber. Antidotes and repellents are not of much account against them, and the latter are soon dissipated in the open air. On the whole Mr. Schwarz thought that the Diptera were not well represented as regards number and variety of species. Forficulidæ were abundant and in great variety, as were also the roaches and crickets in the Orthoptera, and the katydids. Strangely enough they found not a single native dytiscid beetle. Dragonflies and other insects belonging to the neuropteroid orders were poorly represented. There was a remarkable absence of fleas, though the sand flea (*Sarcopsylla*) occurred on the sand of the coast at Puerto Barrios; no bed bugs were seen or heard of, and Mr. Schwarz stated that the driver ants (*Eciton*) constituted a capital enemy of all household insects.

In conclusion Mr. Schwarz exhibited a collection of photographs of Guatemala scenery taken on the trip by Mr. Barber.

OCTOBER 4, 1906.

The 207th regular meeting was held at the Sængerbund Hall, 314 C street, N. W. President Banks occupied the chair and there were present Messrs. Barber, Banks, Busck, Caudell,

Currie, Dyar, Gill, Hopkins, Knab, Patten, Piper, Quaintance, Schwarz, Stiles, and Ulke, members, and Messrs. Marcus Benjamin, C. E. Burden, and C. H. T. Townsend, visitors.

Mr. Knab exhibited a number of photomicrographs of scales from the wings of adult mosquitoes of different species, some of the latter belonging to supposedly different genera. He pointed out how unsatisfactory and inadequate is a classification of genera based on these scale characters and mentioned some of the errors which have been made by attempting to characterize genera from these scales alone, without reference to the larvæ. As an example, *Mansonia fascipes* Coq. and *Pneumaculex signifer* Coq. have larvæ which appear identical, yet have adults which can not be associated by scale characters. The genus *Grabhamia* of Theobald is a composite genus made up of unrelated species which happen to have similar scales. Other instances of this kind were mentioned.

—Mr. Schwarz spoke of the importance of correctly-designated type localities as an aid in the identification of species the descriptions of which are inadequate. He then referred to the difficulty he had experienced in designating intelligibly the localities in which he had made collections with Mr. Barber the past spring in the province of Alta Vera Paz, Guatemala, where settlements are few and many of these consist merely of a few temporary structures, and are not found on the map and have no permanent standing. In cases of this kind good photographs of the localities where collections have been made are often of considerable value, as they show the character of the locality, its topography, etc., which mere names of settlements do not. Mr. Barber took a number of such photographs, many of which are so characteristic that if seen they would be recognized by any one who had visited the localities. One of these, exhibited by Mr. Schwarz, was of the hamlet of Cacao (fig. 5), located at the foot of the cliff of the Thirteen Waterfalls (Trece Aguas) at an altitude of about 900 feet above sea level. This locality presents a most remarkable topographic feature which probably has not its like anywhere else. Mr. Caudell then called attention to the fact that Morse, in a recent paper on Acrididæ, had published photographs of some

of his type localities, and Mr. Piper stated that he knew of other similar instances.

—Mr. Quaintance exhibited a microscopic slide of an *Aleyrodes* apparently identical with *A. citri* R. & H., and coming from China. It was collected on orange, and this, in his opin-

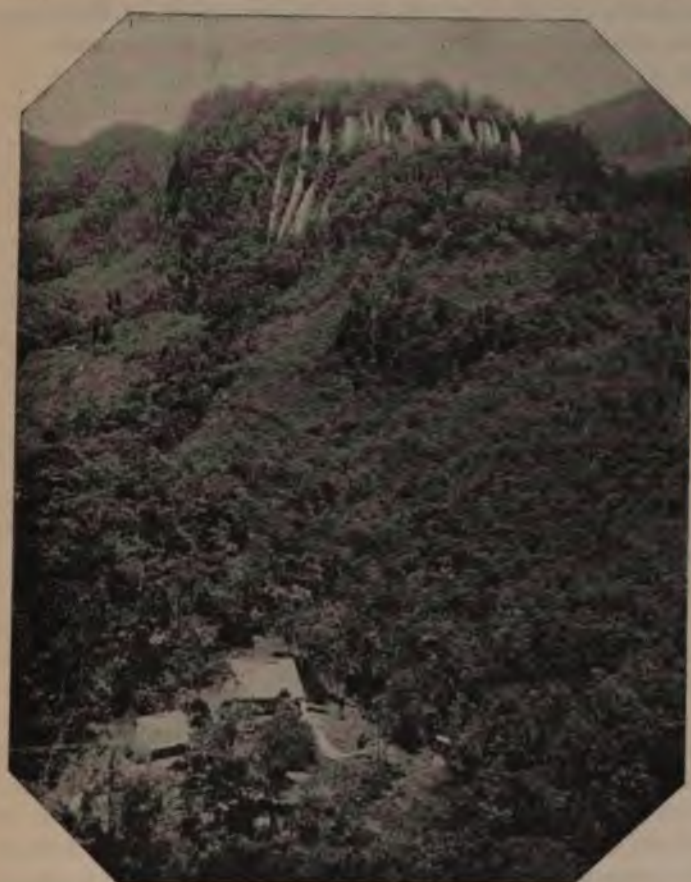


FIG. 5.—Cacao and the Trece Aguas Cliff in Alta Vera Paz, Guatemala.

ion, gave additional evidence to support Prof. Cockerell's suggestion that *A. citri*, the destructive orange white fly of Florida, is native to China and came originally from there.

Another proof lies in the fact that the insect freely infests the "China tree" (*Melia azederach*) and also the Cape Jessamine (*Gardenia jasminoides*), the former, at least, being native to China.

—Mr. Banks exhibited a box of conopid flies taken within five miles of Falls Church, Va., and remarked on their great resemblance to wasps. Thirteen species had been taken, as follows:

Physocephala tibialis Say. Common.

Physocephala sagittaria Say. Less common.

Conops xanthopareus Will. Common.

Conops sylvosus Will. Local.

Conops brachyrhynchus Macq. Fairly common.

Zodion fulvifrons Say. Common.

Zodion abitus Adams. Four specimens at Ceanothus.

Myopa vesiculosa Say. A few specimens.

Myopa pilosa Will. Two specimens.

Oncomyia loraria Loew. Rather rare.

Oncomyia abbreviata Loew. Common.

Dalmania vitiosa Coq. One specimen at Ceanothus flowers.

Stylogaster neglectus Will. Many specimens, mostly near Ceanothus flowers.

Practically all of our species, Mr. Banks stated, favor white flowers, but a few occur at willow bloom in early spring.

—Mr. Banks recorded also the capture of an uncommon dragon-fly, *Neurocordulia obsoleta* Say, near the Chain Bridge, Virginia, last spring. The species had not previously been taken in this vicinity.

—Doctor Dyar, under the title "Notes on Mosquitoes of California," read a paper in which he gave an account of mosquitoes, mostly from the coast region, collected during the past summer. The most extensive collections were made in the vicinity of Los Angeles. On this trip Doctor Dyar collected also along the Southern Pacific Railway between San Francisco and Portland and on the Northern Pacific between Portland and Vancouver, also making a side trip to the Klamath Lake region of southwestern Oregon, and species collected in these regions were alluded to incidentally.

In discussing the paper Mr. Schwarz spoke of the change in

the character of the country in much of the arid portion of southern California, brought about through irrigation. This, naturally, has resulted in a change in the character of the mosquito fauna and an introduction of new forms. There are portions of California, however, where it will probably never be possible to irrigate, and where therefore no faunal changes of this character will occur. Mr. Schwarz mentioned the fact that the western part of the San Joaquin valley contains several faunal regions which well deserve an investigation as regards the mosquitoes and other insects inhabiting them. Mr. Currie then spoke of having collected and reared, among other species, *Culex tarsalis*, *Culex incidens*, and *Anopheles punctipennis* and *maculipennis* at Portland, Oregon, during the season of 1905. *Anopheles punctipennis* was the common *Anopheles* in the places where his collections were made, namely, near the Lewis and Clark Exposition grounds.

—The concluding paper was by Doctor Hopkins, and entitled "Statistical Taxonomy." What was meant by this term was explained by Doctor Hopkins and illustrated by a chart in which the statistical method was applied to bark weevils of the genus *Pissodes*. By a comparison of micrometer measurements of the length of the beak to the length of the thorax and the length of the elytra in a number of individuals of each species, a mathematical formula was obtained which would express the structural proportions of that particular species. Then, by comparing the formulas of different species the relative position of each species in the genus or group would be obtained. This was illustrated in a chart of the species of *Pissodes* in which the application of this method divides them into what Doctor Hopkins believed to be natural groups. Doctor Hopkins explained in conclusion that this method was used by him as a guide to a natural arrangement of species, but not as a means for their determination and as merely secondary to other characters. He called attention to the progressive development of the beak in *Rhynchophora*, from the *Scolytidæ*, which have a non-rostrate head, to the species of *Balaninus* in the *Curculionidæ*, which have extremely long beaks. This elongation of the beak was not, he believed, brought about through use or as a result of

specialized food habits requiring a long beak, but was merely the following out of a dominant tendency to modification along this line without any apparent necessity therefor; in other words, it may not be an adaptive character. Mr. Schwarz asked Doctor Hopkins whether he considered the *Brenthidæ* and *Anthribidæ* as belonging to the *Rhynchophora*. Doctor Hopkins replied that he was uncertain as to the position of the *Brenthidæ*, but the *Anthribidæ* certainly did not belong to the *Rhynchophora*.

NOVEMBER 1, 1906.

The 208th regular meeting was held at the Sængerbund Hall, 314 C street, N. W. President Banks presided and the following persons were present: Messrs. Banks, Barrett, Busck, Currie, Dyar, Heidemann, Hopkins, Knab, Morris, Patten, Quaintance, Sasscer, Schwarz, Ulke, and Webster, members, and Messrs. C. N. Ainslie and David E. Lantz, visitors. The minutes of the October meeting were read and approved. The Treasurer presented a brief report. The Executive Committee reported that they had elected Mr. E. A. Schwarz as Editor and Dr. Harrison G. Dyar as Assistant Editor. At a later meeting they had decided that the election of these editors was not to change the status nor functions of the Publication Committee holding office at the present time.

Prof. E. F. Hitchings, State entomologist, Waterville, Maine, and Rev. James Hansen, St. John's University, Collegeville, Minn., were elected to corresponding membership.

Mr. Quaintance exhibited some masses of larval cocoons of the codling moth (*Carpocapsa pomonella* L.), taken from the floor of an apple storage room in southeastern Nebraska. He stated that the cracks in the boards of the floor were infested with thousands of these cocoons made by the hibernating larvæ. This illustrated in a striking manner the importance of screening the buildings in which apples are stored, so that the moths emerging in the spring can not escape to the orchards.

—Mr. Busck exhibited two California species of the tortricid genus *Hendecaneura* Walsingham. This genus was erected

on three Japanese species and had not hitherto been recorded from this continent. The males of this genus are remarkable through having only 11 veins in the fore wings instead of the usual 12 as found also in the females, the stalked veins 7 and 8 having become coincident in the males. One American genus, *Amorbia* Clemens, and two Australian genera defined by Mr. E. Meyrick—all three containing but few species—were the only other tortricids known to him that exhibited a similar reduction in the number of veins in the fore wing.

Mr. Busck said that his studies in this family had led him to believe that this and other secondary sexual characters, notably the costal fold, could not be relied on as of generic value and that genera which were based on such characters alone would prove to be artificial. The present genus as well as *Amorbia*, however, seemed to be well defined on other peculiarities in the venation, common to both sexes, but other genera, such as *Eucosma*, *Lipoptycha*, and several others, would have to be re-arranged in order to bring about a natural system.

Mr. Busck stated that at present the costal fold on the fore wings of the males was relied upon as one of the primary characters in separating the genera in this family. This, aside from the resulting unnatural grouping, was a constant inconvenience, as by it only the males could be classified.

Doctor Dyar said he believed that the initiative taken by Mr. Busck in the tortricids would have to be followed in other groups of Lepidoptera by the rejection of genera based solely or mainly on secondary sexual characters. Mr. Schwarz pointed out that the more remotely a secondary sexual character is situated from the true characters, the less value it has in classification.

Doctor Hopkins said that his study of the secondary sexual characters in the Scolytidæ and *Pissodes* indicated that without a detailed knowledge of such characters as represented in allied species and genera their interpretation and use as generic and specific characters would lead to much confusion in the future, as it had in the past. Certain characters, such as the more elongate and slender beak and the seven visible dorsal segments in the female curculionid, might be important family and even

superfamily characters; while, on the other hand, certain frontal and elytral declivity characters in the Scolytidæ might be reversed completely in the same genus and in allied genera. It was evident, however, that secondary sexual characters were of great taxonomic value when thoroughly studied and properly interpreted. It would appear that the primary sexual characters of the reproductive organs, while showing striking specific differences in some particulars, often have constant characters in general structure throughout the genus, while certain lines of modification would serve to indicate primary and minor divisions and their natural position in the classification. It should be remembered that in both secondary and primary characters similar body structure and similar stages of evolutionary development might bring about similar characters in very different species, genera, and families.

—Mr. Schwarz showed a beautiful cluster of microgaster cocoons from Cacao, Trece Aguas, in Alta Vera Paz, Guatemala. They were remarkably fine in texture so that the cocoons in the mass could not be distinguished. The mass when found was covered with ants of the genus *Monomorium*, and the larva of which the microgaster was a parasite could not be identified. The mass was afterward placed in a breeding cage and about 200 parasites emerged. These were submitted for examination to Doctor Howard, who pronounced them not the microgaster, nor even a secondary, but a tertiary parasite.

—Doctor Hopkins exhibited specimens of the scolytid beetle *Pagiocerus rimosus* Eichh. and of its work in fruit of the red bay (*Persea barbonia*) and in the pulp and seeds of custard apple (*Anona glabra* and *Anona cherimolia*), and presented the following note:

**A GENUS AND SPECIES OF SCOLYTIDÆ HERETOFORE
UNRECORDED FROM THE UNITED STATES.**

By A. D. HOPKINS.

In April, 1905, the Bureau of Entomology of the U. S. Department of Agriculture received specimens of *Pagiocerus rimosus* Eichh. from Prof. A. L. Herrera, the entomologist of

the Mexican Government, with the statement that they were destroying the pulp and seeds of custard apple (*Anona glabra* and *A. cherimolia*) in Yautepec, Morelos, Mexico. The specimens of the fruit sent with the insects showed the burrows of the beetles in the pulp and seed. The walls of the burrows are apparently covered with a white substance resembling an ambrosia fungus.

In April, 1906, Mr. H. Pittier, of the Bureau of Plant Industry of the U. S. Department of Agriculture, sent specimens of the same beetle from Cauca, Colombia, South America, with a statement that they were found injuring corn, but he failed to send specimens of the work or to describe its character.

On October 4, 1906, the Bureau of Entomology received specimens of the same species from Mr. G. L. Fawcett, of the Bureau of Plant Industry, with numerous injured fruits of the red bay (*Persea barbonia*), found at Miami, Fla. Mr. Fawcett suggested that the insect might prove to be injurious to the avocado or alligator pear, which also belongs to the genus *Persea*. Each fruit shows a single entrance through the thin pulp and seed, and the inner portion of the seed was partially or completely destroyed when received, but no evidence of the immature stages was found. Therefore it may be that the injury was due to a food habit of the adult, and that the broods may develop in stems of graminaceous or herbaceous plants, like corn, cane, palm, etc.

Apparently this is the first record of the food habits of the beetle and also the first record of a representative of the genus *Pagiocerus* in the United States.

Blandford^a states that this species appears to be common and widely distributed in tropical America. Eichhoff^b described it from specimens received from Cuba. Chapuis^c records it from Colombia, Chile, Brazil, and Cuba. In addition, Blandford records it from Mexico, many localities in Guatemala, and one locality in Panama.

The only other described species of the genus is *P. cribricollis* Eichh. from Brazil.

The genus *Pagiocerus* comes near to *Cnesinus*, which is represented in North America by *C. strigicollis* Lec., and is widely distributed in the Eastern and Southern United States, and extends into Mexico. This species has been found by Mr. Schwarz boring in the wood of sweet gum (*Liquidambar*) and the writer has found it in stems of the large smilax or green-

^a Biol. C.-Am., Coleoptera, Vol. iv, pt. 6.

^b Berl. Ent. Zeitschr., 1868, p. 148.

^c Syn. Scol., 1869, p. 26.

briar and a correspondent reports finding it in apple branches in West Virginia. Mr. Fiske found it at Tryon, N. C., boring in the pith of hickory twigs, and at New Landing, S. C., abundant in the stems of smilax. It appears that the larva has not been observed, therefore the breeding habits of this species are uncertain.

Doctor Hopkins showed also specimens of the *Cnesinus* mentioned in the preceding note, and drawings of structural details of the *Cnesinus*, the *Pagiocerus*, and the hickory bark-beetle (*Scolytus quadrispinosus* Say).

—Mr. Schwarz reported that he found adults and larvæ of the cabbage butterfly (*Pontia rapæ* L.) present in hundreds at Trece Aguas, Alta Vera Paz, Guatemala, last spring. This butterfly does not seem to have been recorded from Guatemala and it was an interesting subject for conjecture how it reached this rather inaccessible part of the country. Very little vegetable produce comes to Guatemala from the United States, most of it being imported from Germany, and it would seem that the latter country must prove to be the source of the infestation. Mr. Schwarz described the exceedingly mountainous character of the country in Guatemala.

—Mr. Quaintance asked the opinion of the members as to the function of the cornicles or nectaries of the Aphididæ. He stated that David Sharp, in the portion of the Cambridge Natural History treating of insects, says that although it was formerly supposed that the honey dew is excreted from the nectaries it is now known that this is not the case, but that this substance is excreted from the anus. Mr. Quaintance stated that he had himself observed globules exuding from the nectaries of the cabbage aphid (*A. brassicæ* L.), the apple aphid (*Aphis mali* Fab.), and the red goldenrod aphid (*Siphonophora rudbeckiæ* Fitch). Mr. Pergande, too, had informed him that he had often seen globules of liquid exuding from the nectaries of aphides of many species—not only from those having external tubes but also from those in which the place of the tubes is taken by two simple openings or pores—and in making balsam mounts of aphides from life he had seen drops of fluid exuding

from the tubes and pores and other drops about to exude. Mr. Pergande also informed him that in the case of those gall-making aphides in which no tubes or corresponding pores have been discovered he had noticed drops of liquid in the galls which must have come from the anus.

The matter was discussed by several of the members present and the consensus of opinion was to the effect that while liquid is excreted from the anus yet it is excreted also from the nectaries, and many of the members stated that they had observed the fluid coming from the nectaries.

—Mr. Knab exhibited the volume for the year 1760 of the French journal "Memoires de Mathematique et de Physique," and called attention to an article published therein describing the copulation of mosquitoes. The observations there recorded were made by the commanding officer of a ship in passage from India around the Cape of Good Hope, and from the description of the act it was now possible to recognize the species involved as *Stegomyia calopus*. The copulation was observed after the vessel had been on its way some months and had rounded the Cape, and after storms, indicating that the mosquitoes were breeding on the vessel. The act took place in flight, but there was no swarm and the sexes faced each other and clasped each other with their claws. This agreed with what is now known of the habits of *Stegomyia*. Mr. Knab stated that the mosquitoes recorded in this article as very abundant on board the vessel early in the voyage were probably not *Stegomyia* but *Culex*, and these no doubt perished, while those seen abundantly later, and whose copulation was observed, were *Stegomyia* and were undoubtedly bred on board the vessel. Mr. Knab pointed out that there are two styles of copulation among mosquitoes and these are correlated with the structure of the claws of the female; the mosquitoes which copulate as described for *Stegomyia* have toothed claws in the female, while those in which there is a swarm of males into which the female flies and where the sexes are joined end to end and facing in opposite directions, in the fashion of the Tipulidæ or crane-flies, have simple claws in the female. This character of the toothed or simple claws is not one which has any importance in classi-

fication. Mr. Schwarz related instances of the carriage and breeding of *Stegomyia* on board ship.

—Mr. Banks recorded the capture at Glencarlyn, Va., of the rare syrphid fly *Mixogaster breviventrīs* Kahl. The species was described from Kansas.

—Mr. Schwarz mentioned as an interesting fact that the collection of large tenebrionid beetles of the genus *Eleodes* sent from the National Museum to Dr. F. E. Blaisdell of San Francisco was entirely uninjured by the earthquake, and the specimens were so returned to the National Museum. Although the shock threw the boxes all together in a heap yet not a tarsus was lost. Doctor Dyar stated that the collection of *Lycænidæ* of the National Museum sent for study to Mr. Fordyce Grinnell, Jr., Palo Alto, Cal., was also uninjured by the earthquake.

—Mr. Schwarz presented a paper on the coleopterous fauna of Alta Vera Paz, Guatemala. He stated that this portion of Guatemala had been explored by Godman & Salvin for the Biologia Centrali-Americana and later by Champion, the latter spending four years there. He and Mr. Barber made collections in that region last spring while on a mission for the U. S. Department of Agriculture. Large Coleoptera did not appear to be abundant. About 1,200 species of the order were collected by them in that restricted locality alone. The insect collections which they made at the coast town of Livingston were of quite a different character from those made at Cacao in Alta Vera Paz and from those described in the Biologia, and resemble specimens recorded from British Honduras.

Mr. Knab remarked that in the tropics the dung beetles of the genus *Onthophagus* are often seen resting on the leaves. Mr. Schwarz stated that *Limnichus* in the *Byrrhidæ* and *Pæderus* and certain other staphylinids, which live on the ground along river banks in the United States, live in trees in Guatemala, the necessary moisture for them being found there.

Mr. Schwarz stated that he and Mr. Barber were under great obligations to Mr. O. F. Cook and Mr. F. L. Lewton, of the Bureau of Plant Industry, for procuring for them with great labor the flowers of some palms in which many fine insects were found.

—Mr. Banks presented the following paper :

DESCRIPTIONS OF NEW TRICHOPTERA.

By NATHAN BANKS.

(Plates VIII, IX.)

The following pages contain descriptions of thirty new caduce-flies from the United States, a generic synopsis of the family Sericostomatidæ, and an arrangement of the species of the genus *Neuronia*. Several new genera in the Limnephilidæ are described; these will be tabulated in a future paper on the classification of this family. The whole is preliminary to a catalogue of the Neuropteroid insects of Boreal America, to be published in a short time.

***Phryganea californica*, n. sp.**

Head yellowish brown, with white hair; thorax blackish, with white hair and black bristles; a tuft of black bristles at base of fore wings; the white hair forms a broad median stripe on the thorax; abdomen brown, banded with yellowish or whitish above; legs pale yellowish, with only a very few pale yellowish spines on the tibiæ, anterior tibiæ rather infuscated at tips. Wings uniformly blackish fumose, densely clothed with long black and white hair intermixed, darkest along the basal venation; an elongate white spot on the thyridium before fork, a white dot in base of third apical cell, the cross-vein at base of the fourth apical cell, and the lower part of the arculus hyaline. Both wings very narrow and almost acute at tips, the outer edge in fore pair being straight, not convex, a distinct cross-vein between costa and subcosta near pterostigma; discal cell plainly shorter than its pedicel; first apical sector arising from about middle of cell; the apical cells long and narrow; the arculus straight. In the hind wings the discal cell is very short, not one-third the length of the second apical cell, fifth apical cell very short pedicellate; no cross-vein from radial sector to radius.

Expanse, 33 mm.

One female from California (no definite locality).

***Neuronia inornata*, n. sp. (Pl. IX, fig. 20).**

Head and thorax yellow-brown, abdomen dark brown; maxillary palpi and antennæ yellowish brown; head and thorax with gray hair; legs dull, pale yellowish; both pairs of wings soiled, whitish hyaline; faint indications of brown irrorations near veins of anal area of fore wings; pterostigma rather darkened; venation pale brownish, a dark dot in base of third apical cell. Wings rather broad, sparingly clothed

with short black hair. In fore wings the first apical sector arises before the middle of discal cell, the latter scarcely as long as its pedicel and narrowed at tip; the radius downcurved and then upcurved before the pterostigma; arculus nearly straight, not angulate at end of cubitus, but the branch from median is angulate to meet the arculus. In hind wings there is a cross-vein from discal cell to radius, and the first sector arises from the middle of this cross-vein; the discal cell is very short, the third apical cell narrowed at base. The tibiae of legs have only a few short black spines; those on the hind tibiae not more than one-half the diameter of the joint.

Expanse, 38 mm.

One specimen from St. Anthony Park, Minn. (Pettit).

***Neuronia canadensis*, n. sp.**

Head black; face with erect golden hair; posterior warts rufous, bearing rufous hair; palpi pale; antennae reddish brown; lobes of prothorax yellowish, and with long yellowish hair; thorax black, lateral lobes pale, and the scutellum rufous, with golden hair; legs yellowish, with golden hair and black spines, femora blackish on bases; abdomen black. Wings yellowish, fore pair densely irrorate with brown, a larger spot before and after pterostigma, and at ends of veins, and at arculus; venation brown; membrane finely granulate, and with sparse golden hair. Hind wings yellowish hyaline, a brown spot before pterostigma, and beyond a few brown irrorations, and dark at ends of veins. Fore wings broad, broadly rounded at tip; discal cell about three-fourths as long as pedicel; first apical cell as long on discal as width of latter, fifth not extending back as far; the arculus angulate; cross-vein from median to cubitus ends beyond forking of latter vein.

Expanse, 28 mm.

One specimen from Guelph, Ontario, Canada (Jones). Differs from nearly all others by fork 1 arising beyond middle of discal cell; from *stygipes* and *pardalis* by pale hind wings; from *lapponica* and *dossuaria* by broader, more densely irrorate wings, and curved arculus.

Genus NEURONIA Leach.

ARRANGEMENT OF SPECIES.

1. First apical sector arising at or before middle of discal cell.....2
 First apical sector arising beyond middle of discal cell.....4
2. Arculus plainly angulate at end of cubitus; wings more or less yellowish, and marmorate with brown [*ocellifera*, *semifasciata*, *postica*, and *augustipennis*].
 Arculus nearly straight3

3. Fore wings marmorate with dark brown.....*concatenata*.
Fore wings almost unicolorous.....*inornata*
4. Hind wings black on basal part; feet black.....5
Hind wings pale on basal part; feet pale.....6
5. Second subapical cell with base longer than of the third..*pardalis*
Second subapical cell with base not longer than that of the third.
.....*stygipes*.
6. Wings white, with few black band-like reticulations; arculus straight;
wings narrower*dossuaria*.
Wings yellowish, with many brown markings; arculus curved;
wings broader*canadensis*.

Anabolia montana, n. sp.

Head dark brown; antennæ paler brown, narrowly annulate with darker; palpi yellowish; thorax brown, with a jet black stripe on each side of mesothorax, narrowly bordered with white internally. Legs yellowish; tips of tarsi and tip and middle of anterior tibiæ outside blackish; spines black. Fore wings dark brown, anal field darker than elsewhere, and costal rather pale, sprinkled with many fine, pale dots, much more numerous in apical part, a larger, pale oblique mark on the thyridium, and one smaller at arculus, also some spots along the outer margin; a pale geminate spot in base of the third apical cell; pterostigma slightly darker than rest of wing. Hind wings hyaline, darker near the pterostigma, and a dot in base of third apical cell. Venation very similar to *A. bimaculata*, but the fifth apical cell is scarcely as acute at base, and the discal cell a little shorter than in that species; the hind wing is less excised below the apex than in *A. bimaculata*.

Expanse, 30 mm.

Four specimens from Franconia, Mt. Washington, N. H., and Mt. Katahdin, Maine.

Halesochila, n. gen.

Last joint of hind tarsi without spines beneath; the pterostigma thickened and very prominent; first apical cell broad at base, membrane of wing not granulate; spurs 1-3-3; mesothoracic strips short and with few bristles; fork 3 present in hind wings.

Type: Halesus taylori Banks.

This genus is near *Chilostigma*, but differs in smooth membrane of wings, and in the spur formula.

Allophylax, n. gen.

Last joint of hind tarsi without spines beneath; pterostigma not thickened nor prominent; mesothoracic strips short, not nearly one-

half the length of mesothorax; fork 3 present in hind wings; spurs 1-3-4; first apical cell reaching back on discal cell more than the width of latter; wings very broad.

Type: Stenophylax punctatissimus Walker.

Differs from *Stenophylax* in great length of the first apical cell.

***Stenophylax minusculus*, n. sp. (Pl. IX, fig. 12).**

Head black, yellowish hairs on the vertex, gray on the face; palpi blackish; antennæ brown, basal joint black; thorax and abdomen black, tip of latter brown, yellowish hair on prothorax and mesothorax; legs pale yellowish, femora black, except at extreme tips, last joint of tarsi brown, spines black. Fore wings hyaline, largely marked with brown; venation brown; apical cells mostly hyaline, subapicals mostly brown, anal area brown, costal area pale, middle area of wing brown, extending out above to the brown pterostigma, a pale spot in apex of discal cell, a longer spot in apex of thyridial and median cells; the arculus, and a dot on thyridium before fork white-hyaline; hind wings hyaline, venation pale. Fore wings rather narrow, discal cell slightly longer than its pedicel, radius bent near pterostigma, cubitus disjointed at posterior anastomosis. In the hind wings the discal cell is plainly shorter than its pedicel; the third apical cell is widened at base, and has a dark dot; the fourth is narrowed at base, and the fifth reaches quite a little before it.

Expanse, 18 mm.

One specimen from Olympia, Washington (Kincaid).

***Parachiona signata*, n. sp.**

Head and antennæ yellowish brown, palpi paler; vertex with yellowish bristles from the warts; large yellow bristles from pronotum; thorax and abdomen yellow-brown, darker on tip of latter; legs pale yellowish, spines black. Fore wings yellowish brown, darker along median vein and in anal area, paler in costal area, venation pale brownish, outer anastomosis dark brown, and margined with brown, a large hyaline spot on the thyridium, and a pale dot in base of third apical cell; hind wings hyaline, venation pale. Head rather short and transverse, no macrochèta behind ocelli; basal joint of antennæ large and long. In the fore wings the discal cell is about equal to its pedicel, the fifth apical cell not reaching before fourth; the cubitus not disjointed at the posterior anastomosis, radius bent near pterostigma. In hind wings the discal cell is shorter than its pedicel, the fourth apical cell has an oblique base, the fifth not reaching before it.

Expanse, 27 mm.

One specimen from Idaho, July (R. W. Doane).

***Parachiona pilosa*, n. sp. (Pl. IX, fig. 13).**

Black, shining; head with black hair; antennæ dark brown; pronotum with some long golden-yellow hair, lateral lobes in front of the wings are bright yellow, and clothed with golden-yellow hair; abdomen dark brown, a stripe each side paler; legs yellow-brown, darkest on the femora; spurs 1-3-4; a few black spines on the tibiae. Wings uniform blackish brown, clothed with black hair, a hyaline spot just before the fork of the median vein, and the arculus also hyaline; hind wings rather paler than the front pair, and with brown fringe. Both pairs of wings rather broad, and broadly rounded at the tips; discal cell of fore wings is slightly longer than its pedicel, but not nearly as long as the apical cells, all of which are of equal length, and the fifth acute at base. In the hind wings the first apical does not reach before the cell, and the fourth apical is widened at base. The mesothoracic strips are very short; and the palpi are also very short.

Expanse, 16.5 mm.

One male from Olympia, Washington State, in May (Kincaid).

***Limnephilus oslari*, n. sp. (Pl. IX, fig. 19).**

Dull yellowish, clothed with yellowish hair; spines on the legs black. Fore wings yellowish hyaline, venation pale, an elongate brown cloud in middle of basal part, each side of median vein; a small patch near apex of discal cell, a dark brown spot in thyridial area above posterior anastomosis, and containing a minute pale dot; obliquely backward from this is an irregular dark cloud, mostly between the cubital and median veins, and containing a geminate pale spot; beyond the posterior anastomosis toward the hind margin mostly brown, with many pale spots and dots; apical cells with some indistinct dark spots, most prominent at the outer margin; anal area uniformly pale brown; a dark dot in base of third apical cell. Hind wings hyaline, venation pale yellowish. Maxillary palpi of female with last joint longer than the preceding; ocelli rather small; vertex moderately flat; posterior warts not very large; basal joint of antennæ rather long; vertex with a pair of submedian bristles backward and toward middle from the ocelli; bristle-bearing strips of metathorax elongate and narrow. Fore wings long and narrow, outer margin oblique, almost concave; discal cell very long and slender, but not twice the length of the pedicel, longer than any apical cell; first and fifth apical cells reach about the same distance back of anastomosis; radius very strongly bent at pterostigma; cubitus much disjointed at the anastomosis, so that the third subapical

cell is broad at base. In hind wings the discal cell is about as long as the pedicel, and as long as any apical cell; all apicals broad at base, but the fourth rather narrower than the others; the vein from the posterior anastomosis arises much nearer to the cubitus than to the median, and then curves forward.

Expanse, 44 mm.

One female from South Park, Col., 25 May (Oslar); others from Wellington, B. C., and Tabernash, Colo.

***Pycnopsyche similis*, n. sp. (Pl. IX, fig. 25).**

Head and thorax reddish yellow, palpi pale yellowish, antennæ rather reddish yellow; legs pale yellow, with black spines; abdomen pale at base, nearly black at tip; fore wings pale yellowish, outer edge broadly bordered with brown, a brown spot in base of third apical cell, containing a darker dot, another smaller in fifth apical cell, and three discal brown spots forming a discal band like that of *P. guttifer* and *Platyphylax subfasciata*, but not quite as long; a hyaline spot on the thyridium before the fork; venation pale; hind wings hyaline, venation pale. Wings shaped and veined as in *P. guttifer*. No macrochæta back of ocelli, but hairs on the vertex, thoracic strips very short and narrow, with only five or six tubercles in each; spurs 1-3-3.

Expanse, 30 mm.

Two specimens from Agricultural College and Chatham, Mich., August, September.

Very similar to *P. guttifer* (Pl. IX, fig. 22), but distinct by genitalia of male.

***Phryganomyia*, n. gen.**

A limnephilid; no spines on last joint of hind tarsi; fore wings rather slender, apical cells very long and narrow, first not reaching far on discal cell; in hind wings the discal cell is very short, and there is a cross-vein from the first apical sector near its base connecting to the radius; spurs 1-3-4; ocelli very large; no macrochæta back of the ocelli; maxillary palpi short, in the male the basal joint is as long as either of the other joints, a condition very rare in the Limnephilidæ.

Type: Asynarchus alascensis Banks.

The genus *Phryganomyia* includes also the following new species.

***Phryganomyia obscura*, n. sp. (Pl. VIII, fig. 6).**

Head, antennæ, and palpi yellowish, vertex with yellowish hair, but no macrochæta back of the extremely large ocelli; thorax yellowish,

with whitish hair; abdomen dark brown, appendages pale yellowish; legs pale yellow, with yellowish spines and spurs. Fore wings dull yellowish hyaline, venation pale brown; faint traces of brown irroration on hind part of the wings; hind wings yellowish hyaline, venation pale. Fore wings rather slender, discal cell plainly shorter than pedicel, not nearly as long as the apical cells, first and second apicals both with oblique bases, fifth scarcely reaching before the fourth, cubitus disjointed at posterior anastomosis. In hind wings the discal cell is very short, only about one-third the length of its pedicel, apical cells very long, fifth reaching only a little before fourth.

Expanse, 22 mm.

One specimen from Tupper Lake, Minn. (Pettit).

Ecclisomyia, n. gen.

A limnephilid; no spines on last joint of hind tarsi; spurs 1-2-4; fore wings rather long, the discal cell is very long, and the first apical cell is more than twice the width of discal cell upon the latter; the outer margin is rounded; in the hind wings the fourth apical cell is not narrowed at base. Ocelli large, no macrochæta behind them; the basal joint of antennæ rather longer than usual.

Type: E. conspersa, n. sp.

Ecclisomyia conspersa, n. sp. (Pl. IX, fig. 14).

Head reddish yellow, vertex with a triangular black spot enclosing the ocelli, no hairs on the vertex, but black bristles from the warts; antennæ and palpi yellowish; thorax reddish brown, darker on each side; abdomen yellow-brown, darker toward tip above; legs pale yellowish, spines black. Wings pale brown, with scattered, whitish hyaline dots, a larger one on the arculus; the hyaline spot in the third apical cell and that just below the thyridium are geminate with a brown dot; membrane with short black hairs, venation pale brown; hind wings hyaline, venation pale. In the fore wing the discal cell is three times as long as its pedicel, yet barely as long as the third apical cell.

Expanse, 27 mm.

One specimen from Olympia, Wash. Differs from *E. maculosa* in larger size, absence of pale spot on thyridium, larger spot on arculus, etc.

Ecclisomyia maculosa, n. sp. (Pl. IX, fig. 18).

Head reddish yellow, vertex blackish in middle; antennæ and palpi pale yellow, all with yellowish hair; legs pale yellowish, spines black; abdomen brown. Fore wings nearly uniform brownish, with some scat-

tered, rather large hyaline spots, most numerous in apical part; venation very pale. Hind wings hyaline. Head rather more transverse than usual, vertex convex; ocelli large, nearer to median line than to eyes; posterior warts small; antennæ almost crenulate beneath, basal joints not very long; maxillary palpi of female long, last joint a trifle longer than penultimate. Spurs 1-3-4. Costal area of fore wings rather broad; outer margin rounded; radius not bent at pterostigma; discal cell fully twice as long as pedicel, and about as long as any apical cell; first apical cell reaching back on discal nearly one half way; fifth apical but little before anastomosis, acute at base; posterior anastomosis oblique, the cubitus not disjointed at that place. In hind wings the discal cell is longer than pedicel, but not nearly as long as some of the apical cells; first apical some distance on discal cell; fifth not reaching back of anastomosis, acute at base; the second vein beyond the fifth apical cell forms an elongate, closed cell with the next vein, as in figure (so in both hind wings). Margins of wings with rather long fringe.

Expanse, 15 mm.

One female from Boulder, Colo., July 31 (Osler).

Probably related to the *Stenophylax dubius* of Europe, which has a long first apical cell in fore wings.

Notidobia assimilis, n. sp. (Pl. VIII, fig. 8).

Body black, base of abdomen beneath yellowish, appendages yellowish; legs brown, very slender; wings yellowish brown, with sparse gray vestiture, venation brown, mostly indistinct, fringes black; hair on face black, on abdomen pale, but sparse, on appendages black and long; abdomen of male long and slender. Male appendages broad, concave within, a small notch above toward base, outer edge with several long spine-like bristles; on upper inner corner is a recurved tooth within as in the two species from California described by McLachlan; the median piece is large, blunt-pointed, and the tip is seen in side-view; the tip of abdomen, both above and below, bears many long, curved hairs.

Expanse, 19 mm.

Two specimens from San Diego, Cal. (Field).

Brachycentrus similis, n. sp. (Pl. IX, fig. 21).

Head brown, white hairs above; maxillary palpi brown, with gray hairs in front; labial palpi paler; antennæ with basal joints dark brown, beyond paler brown, narrowly annulated with yellow; thorax dark, a broad pale stripe on the middle; abdomen dark brown, with yellowish and whitish hairs; legs yellowish, anterior femora blackish, others barely so. Wings smoky, darker on costal region near tip, a few faint

traces of pale spots on margin between the veins. Hind wings paler gray, with gray fringe. Venation as in the other species. The tip of male abdomen has two plates, showing from above a median emargination between them, in this differing from all our other species.

Expanse, ♂, 20 mm.; ♀, 25 mm.

A male from Tabernash, Colo., August (Tucker) and female from Boulder, Colo., August 9, at light (Cockerell).

***Lepidostoma stigma*, n. sp. (Pl. VIII, fig. 10).**

Head brown; palpi yellowish; basal joints of antennæ brown, as long as width of head, beyond yellowish, with narrow brown annuli; thorax dark brown, four warts on pronotum; coxæ dark brown, rest of legs pale yellowish, with white hair, spurs pale; abdomen dark brown above, pale beneath; wings dull brownish, with scattered black hairs; in both pairs a broad streak of dark brown over the posterior fifth of radius, extending up to subcosta and nearly reaching radial sector; venation as figured; anal margin of hind wings with long cilia.

Expanse, 18 mm.

One female from Colorado (Oslar), and two from Boulder, Colo., Aug. 9 (Cockerell), at light.

***Thremma deceptiva*, n. sp. (Pl. VIII, fig. 1).**

Head brown; vertex shining; a distinct ocellus over each antenna and between bases; basal joint of antennæ yellow-brown, scarcely as long as distance from eye to eye, beyond yellowish, narrowly annulate with brown; palpi yellow, in female upturned; thorax brown; legs pale yellowish, spurs 1-3-4; abdomen large, venter and sides pale, dorsum light brown; wings nearly hyaline; venation brown, a large elongate dark spot in stigmal region of both pairs, and a minute dot in base of third apical cell.

Expanse, 15 mm.

One female from Beulah, New Mexico, 8,000 feet (Cockerell).

Differs from the type of the genus in longer wings and longer discal cell and fork 3, and in that in the hind wings fork 1 is present.

***Helicopsyche arizonensis*, n. sp.**

Head clothed with gray hair, palpi and basal joints of the antennæ with brown hair, rest of antennæ pale yellow, narrowly annulate with brown; thorax black, with some yellowish and gray hair; abdomen brown, darker above than below, legs yellowish, brownish on the basal

half of femora and apical parts of hind tibiæ, tarsi pale, faintly marked with dark at extreme tip of joints. Wings of a uniform brown, without marks, but seen to have many short golden hairs, fringe dark brown, hind wings dark gray, with a longer, blackish fringe. Fore wings rather long (longer than in *H. borealis*), hind wings much shorter, and acute at tips; the middle tibiæ have beneath a row of about twenty-five short, but stout, black spines.

Length, 8 mm.

Three examples from Nogales, Ariz. (Oslar), in July. Differs from *H. borealis* and *H. californicus* by annulate antennæ.

Family SERICOSTOMATIDÆ.

TABULAR VIEW OF THE GENERA.

1. A cross-vein connecting radius to radial sector near discal cell....2
No such cross-vein present.....4
2. The cross-vein above discal cell; five apical cells in fore wings.
Notidobia.
The cross-vein is beyond discal cell; seven apical cells in fore wings.3
3. In hind wings only one pedicellate apical cell, seventh apical broadly truncate at base; joints 2 and 3 of maxillary palpi barely longer than joint 4.....*Namamyia*.
In hind wings two pedicellate apical cells (5 and 7); maxillary palpi with joints 2 and 3 plainly longer than 4.....*Nerophilus*.
4. Discal cell in hind wings closed; basal joints of antennæ long, and densely hairy; spurs 1(2)-4-4 or 1-3-4.....5
Discal cell of hind wings open.....11
5. Ocelli present; spurs 1-3-4.....*Thremma*.
No ocelli; four spurs on middle tibiæ.....6
6. Discal cell in fore wings much longer than pedicel; a small cell on posterior margin of fore wing beyond middle; male with maxillary palpi small, erect, appressed; no scales on hind wings.
Notiopsyche.
Discal cell in fore wings not, or barely, longer than pedicel.....7
7. Discal cell about as long as pedicel; in hind wings first apical cell scarcely extends back of second; male with anal vein of fore wings running into margin, and not connected near tip to cubitus.8
Discal cell plainly shorter than pedicel; male without scales on hind wings, neither labial palpi nor tarsi 1 enlarged; the connection between median and cubitus beyond middle of wing.....9
8. Male with labial palpi and first joint of tarsus 1 much enlarged (female unknown)*Nosopus*.
Male without such parts enlarged; scales on hind wings; female

- with basal joints of antennæ very long.....*Lepidostoma*.
9. Anal vein apparently running straight into branch of cubitus, really connected to cubitus by a cross-vein sloping backward.....10
 Anal vein running into margin, or in female connected to branch of cubitus by a cross-vein; male with costal margin broadly recurved over wing*Olemira*.
10. In fore wing a longitudinal vein between anal and cubitus for some distance; four apical cells in hind wings; cubitus of fore wings with one fork; male maxillary palpi heavily hirsute, porrect.
Atomyia.
- In fore wing no such vein between anal and cubitus; three apical cells (or really two) in hind wings; cubitus of fore wings with two forks; maxillary palpi of male small, slender, upcurved and appressed*Mormomyia*, n. gen. (*Mormonia vernalis* Banks).
11. Spurs 2-2-2; forks 2 and 3 present in fore wings....*Oligoplectrum*.
 Spurs 2-3-3; forks 2 and 3 present in fore wings; antennæ rather widely separated*Brachycentrus*.
 Spurs 2-2-4; forks 2 and 3 absent in fore wings.....*Helicopsyche*.
 Spurs 2-4-4; area interclavialis enlarged at tip.....*Goera*.

***Trienodes frontalis*, n. sp. (Pl. IX, fig. 11).**

Head black, clothed with snow-white hair, a large tuft under each antenna with some black hairs in it; palpi brown, with white hair; antennæ with snow-white hair, and brown annulations at ends of joints; thorax black, with snow-white hair; abdomen yellowish; legs yellowish, with yellowish hair. Fore wings mostly clothed with white and gray hair, some black hair, especially on apical part; a black mark on radius near stigma, one on median near cell, and one at arculus, with black fringe at this point; apical part more or less irrorate with brown or black; hind wings smoky, blackish on tips, fringe gray.

Expanse, 16 mm.

One from Ft. Collins, Colo., 20 June (Baker).

Readily separated from *T. grisea* by black head and snow-white hair.

***Setodes vernalis*, n. sp. (Pl. VIII, fig. 3).**

Pale yellowish; abdomen dull brown, except paler appendages; wings rather dusky, with the radius and cubitus dark brown; hairs on costal region golden, in apical part mostly blackish; forks 1 and 3 of equal length, the first with a pedicel rather longer than the veinlet closing the discal cell; lower branch of radial sector ending at tip of wing. Hind wings rather dusky, scarcely darker on tips, fringe long, and dark gray. Appendages of male as figured; a long, slender, curved piece each side, which, seen from above or below, meets its fellow to form a circle, their inner edges with long fine hairs.

Expanse, 11 mm.

High Island, Maryland (near Washington), 17 June; several specimens.

***Setodes autumnalis*, n. sp. (Pl. IX, fig. 23).**

Pale yellowish throughout, clothed with pale yellowish hair, wings with golden hair; abdomen rather brighter yellow at tip. Wings very slender, both pairs acute at tips, fork 1 with pedicel as long as veinlet closing discal cell, fork 3 no longer than fork 1. In hind wings the radial sector is not distinct on basal portion. Last segment of abdomen of male is very large, upturned, and has a hairy appendage near tip, narrow at base, broad and rounded above.

Expanse, 14 mm.

High Island, Maryland (near Washington) 28 September.
Readily known by pale yellow color.

***Setodes grandis*, n. sp. (Pl. VIII, fig. 4).**

Head and thorax dark brown, clothed with mostly white hair; palpi brown, with brown hair; basal joints of antennæ brown, beyond yellowish, narrowly annulate with brown at tips of joints; legs pale yellowish, first pair darker. Abdomen pale, sometimes darker on tip. Wings dusky, with sparse black hair; radius and cubitus dark brown; hind wings faintly dusky, with gray fringe. Both pairs are long, and acute at tips; fork 3 much longer than fork 1, the latter very short pedicellate; lower branch of radial sector ending slightly before tip of wing.

Expanse, 16 mm.

Three from New Haven, Conn., 23 June (Viereck); also from Falls Church, Va.

***Æcetina inornata*, n. sp.**

Yellowish, clothed with yellow hair; palpi with more gray hair; antennæ narrowly annulate with dark; abdomen and legs entirely pale yellowish. Wings hyaline, densely clothed with golden, and some blackish hair, apical fringe rather long, and brown; anostomoses not marked, the posterior one very oblique; hind wings more hyaline, with sparse blackish hair, and long dark fringe. Maxillary palpi rather heavy, and densely haired. Fore wings with both forks not extending back of discal cell; in hind wings the second fork has a pedicel nearly its length, and the first fork extends only a short distance back on the discal cell.

Expanse, 18 mm.

Douglas, Ariz., August (Snow).

***Æcetina apicalis*, n. sp. (Pl. VIII, fig. 2).**

Yellowish, clothed with yellowish hair; palpi with darker hair; antennæ annulate with black; abdomen pale above, almost black beneath; legs pale yellowish. Wings very sparsely clothed with very fine black and yellow hairs; the anastomoses broadly margined with black, the posterior one running obliquely backward; membrane toward apex is blackish; hind wings more hyaline, with a long black fringe on posterior margin, especially heavy near base. Maxillary palpi heavy, and densely haired. Fore wings nearly acute at apex, both forks barely reaching back of the anastomosis; in hind wings the second fork starts from the discal cell, the first extending back a considerable distance on the cell.

Expanse, 18 mm.

One specimen from Brownsville, Tex., June (Snow).

***Æcetina persimilis*, n. sp.**

In appearance this species is very like unto *Æ. incerta* and *Æ. parvula*, and about intermediate in size, or as large as a small *Æ. incerta*. The wings are clothed with long gray hairs, and the anastomosis is dark brown. It belongs, however, to the other section of the genus; having in the hind wings the cross-vein connecting fork 1 to fork 3; so it is more allied to *Æ. fumosa*. It differs, however, from that species in smaller size, lack of patches of black hair on the wings, and in that the cross-vein closing the discal cell is as long as the next cross-vein beyond it (plainly shorter in *Æ. fumosa*).

Specimens from High Island, Maryland, and from Glen-carlyn, Va., in June.

The genus *Æcetina* differs from the European *Æcetis* (type *ochracea*) in having much narrower hind wings, and in that the cross-vein at end of discal cell of fore-wing is considerably beyond the other cross-veins. The European *Æ. lacustris*, and probably other species, belongs to *Æcetina*. The species of *Æcetina* may be arranged in two sections, according to position of the cross-vein in the hind wings. In one section the cross-vein connects forks 1 and 3, while in the second section the cross-vein ends in the median before the origin of fork 3. The first section includes *Æ. fumosa*, *avara*, *apicalis*, and *persimilis*; the second section contains *incerta*, *flavida*, *guttata*, *floridana*, *ornata*, *parvula*, and *flavcolata*.

***Setodina*, n. gen.**

A leptocerid near *Setodes*, but the last joint of the maxillary palpi is short, although a little curved; the spurs are 0-2-2; forks 1 and 3

are present in the fore wings, 1 and 5 in the hind wings; there is no cross-vein in the hind wings; antennæ much longer than the body, basal joint very large. Based on a tiny insect, no larger than a good-sized hydroptilid, which differs from all other Leptoceridæ in the greatly reduced venation of the hind wings.

Type: The following species.

Setodina parva, n. sp. (Pl. IX, figs. 24, 26).

A uniform dull pale gray; legs and antennæ more yellowish; wings clothed with gray hairs. Fore wings quite slender; the radius and subcosta close together; the discal cell longer than second apical cell; the cross-veins are very faint, but can be seen against a strong light; hind wings with a long fringe behind, no cross-veins present; in the basal part of third apical cell of the fore wings there is a small dark dot.

Expanse, 5.5 mm.

Three specimens from Kissimmee, Fla., in November.

Hydropsyche minuscula n. sp. (Pl. VIII, fig. 5).

Dull black, head and thorax clothed with yellowish gray hair, almost golden on vertex, with some black hair each side; antennæ pale, annulate with dark; abdomen blackish above, yellowish below; legs yellowish, with yellow spurs, some longer black hair on hind tibiæ. Wings clothed with black and yellowish hair, giving them a uniform grayish or brownish appearance, devoid of markings, except sometimes a little more heavily marked with black on the middle of the hind margin, and sometimes a faint yellowish mark near outer anal angle; fringe blackish, or broken with yellow near outer anal angle; hind wings gray, with gray fringe. Eyes of male widely separated; antennæ rather heavy; fore wings broadly rounded at tips, fork 1 reaching more than one-half way to discal cell; in hind wings fork 1 is absent, and the tip is slightly upturned.

Length, 6 mm.

Several specimens from Plummers Island, Maryland, in August.

It falls in Ulmer's genus *Hydropsychodes*, which differs from *Hydropsyche* only in lacking fork 1 to hind wings; *H. analis*, *H. sordida*, *H. gracilis*, and *H. divisa* will also go in this genus, if it be adopted.

Phylocentropus, n. gen.

An hydropsychid near *Holocentropus*; venation as in that genus except that fork 1 in both wings arises from the discal cell; in this

respect like *Wormaldia*. Forks 1, 2, 3, 4, 5 in fore wings; 1, 2, 3, and 5 in hind wings. Fore wings with distinct costal cross-vein; discal cell closed in both pairs of wings; spurs 3-4-4; tibia and metatarsi of middle legs dilated in female; no ocelli.

Type: Holocentropus placidus Banks.

The genus also includes *Polycentropus lucidus* Hagen.

Nyctiophylax Brauer.

This genus includes *Polycentropus vestitus* Hagen and *P. affinis* Banks; and it is probable that *Cyrnus pallidus* Banks and *C. fraternus* Banks also belong here; they have the superior branch of radial sector present in hind wings, but the closure of the discal cell is extremely indistinct, if always really present.

Plectrocnemia australis, n. sp. (Pl. IX, fig. 17).

Face below antennæ deep black, with black hair; palpi black; head above antennæ with much golden hair, but a tuft of long, black hair above each eye; antennæ yellow, faintly annulate with pale brown; thorax with a stripe of yellow hairs in the middle, and black hair on each lateral lobe; abdomen brown; legs rather brownish yellow. Wings brown, thickly spotted with yellow, median vein and anal region darker brown than elsewhere, a patch of longer black hair near base of fore wings, and several black marks along the costa. Hind wings grayish hyaline, darker near tips on costal part. Venation like *P. conspersa*, but fork 1 is not nearly as long as its pedicel; fork 5 is wide-spread at base. The legs are long and slender; on middle tibiæ the submedian spurs are as far from base as the longer spur of the pair; on hind tibiæ the submedian spurs reach scarcely more than one half way to tip; and the apical spurs are hardly one half the length of the first tarsal joint. The tip of female abdomen ends in a slender upcurved, ovipositor, widened at tip.

Expanse, 21 mm.

From Jacksonville, Fla. (Mrs. Slosson).

Psychomyia moesta, n. sp. (Pl. VIII, fig. 9; Pl. IX, fig. 15).

Head and thorax black; vertex with white hair, and some white hair near the tubercled pits on mesonotum; antennæ pale yellowish; palpi brown, with black hair; legs pale yellowish, with large, long spurs, 2, 4, 4, no trace of another on front tibiæ; all legs with many fine yellowish hairs; abdomen brown, appendages yellowish; wings dull brownish, without mark, densely black-haired, but these hairs most prominent along anal field where they are nearly distinct enough to

form a stripe. Fore wings veined as in *Psychomyia*, fork 1 not present; hind wings more excavate on apical half of front margin than any figured species, and fork 3 is not present, thus like *Ecnomus*; fringe on hind edge of hind wings about as long as width of wing; middle tibiae and metatarsi plainly dilated in female.

Expanse, 11 mm.

One female from Colorado (No. 2133), probably Ft. Collins or Denver.

***Rhyacophila torva* Hagen (Pl. IX, fig. 16).**

In the Eastern States there are at least three allied species. I identify as *R. torva* a form with more spotted wings than the others. It has the lower branch of the median vein in fore wings forked before the middle, so that the fork is longer than its pedicel; this fork is not as near base as the fork of the upper branch of the radial sector. The male genitalia show a forked process each side below.

I have specimens from Sherbrooke, Canada; Franconia, N. H., and Sea Cliff, N. Y.

***Rhyacophila terminata*, n. sp. (Pl. VIII, fig. 7).**

In this species the lower branch of the median vein in fore wings is forked much beyond the middle, so that the fork is much shorter than its pedicel, and no longer than the fork of the upper branch. The wings are not very dark, rather sparingly flecked with yellow, and the basal joint of the antennae is much darker than the others. The male genitalia show a pair of very long appendages below.

From Delaware Water Gap, New Jersey. Two females from Ithaca, N. Y. agree in venational characters, but are in poor condition.

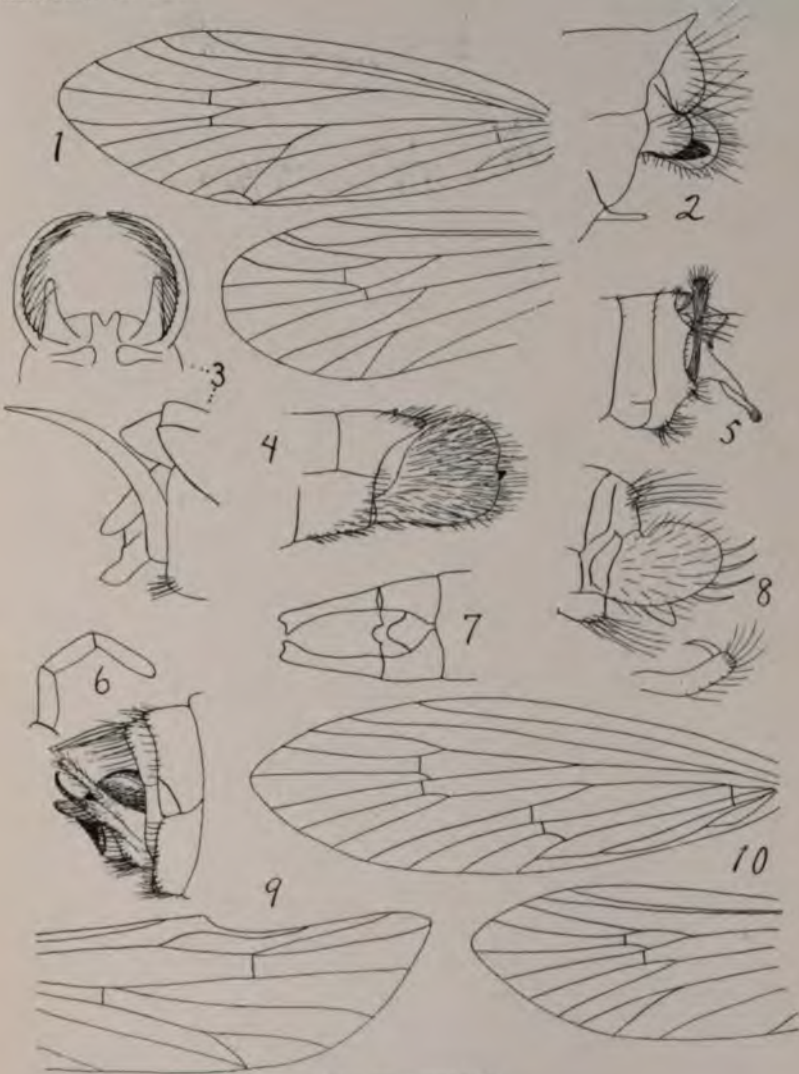
***Rhyacophila nigrita*, n. sp.**

Much like *R. torva*; with the fork of lower branch of the median vein before the middle, so that the fork is longer than the pedicel; this fork is as near to the base of wing as the fork of upper branch of the radial sector. Wings a deeper black than in *R. torva*.

Two specimens from the Black Mts., North Carolina, June.

EXPLANATION OF PLATES.

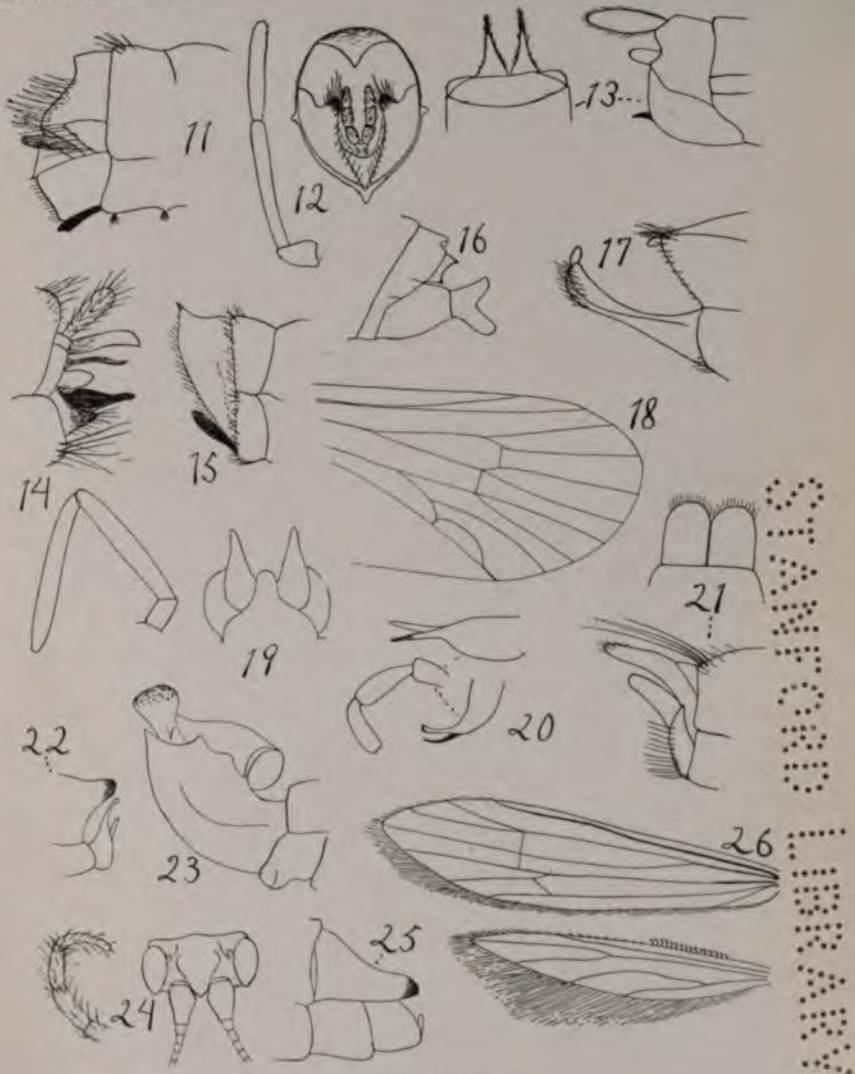
- FIG. 1. *Thremma deceptiva*: wings.
2. *Æcetina apicalis*: male genitalia.
3. *Setodes vernalis*: male genitalia.



NEW TRICHOPTERA.

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NEW TRICHOPTERA.

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4. *Setodes grandis*: male genitalia.
5. *Hydropsyche minuscula*: male genitalia.
6. *Phryganomyia obscura*: male genitalia and palp.
7. *Rhyacophila terminata*: male genitalia.
8. *Notidobia assimilis*: male genitalia.
9. *Psychomyia mæsta*: hind wings.
10. *Lepidostoma stigma*: wings.
11. *Trienodes frontalis*: male genitalia.
12. *Stenophylax minusculus*: male genitalia and palp.
13. *Parachiona pilosa*: male genitalia.
14. *Ecclisomyia conspersa*: male genitalia and palp.
15. *Psychomyia mæsta*: female genitalia.
16. *Rhyacophila torva*: male genitalia.
17. *Plectrocnemia australis*: female genitalia.
18. *Ecclisomyia maculosa*: hind wing.
19. *Limnephilus osleri*: female genitalia.
20. *Neuronia inornata*: palp and claspers.
21. *Brachycentrus similis*: male genitalia.
22. *Pycnopsyche guttifer*: male genitalia.
23. *Setodes autumnalis*: male genitalia.
24. *Setodina parva*: head and palp.
25. *Pycnopsyche similis*: male genitalia.
26. *Setodina parva*: wings.

—The following papers were presented for publication.

NOTES ON UNITED STATES ORTHOPTERA, WITH THE DESCRIPTION OF ONE NEW SPECIES.

By A. N. CAUDELL.

In June, 1905, Dr. J. Hornung, of Menlo Park, Cal. sent to the National Museum several specimens of a large black earwig for determination. These proved to be *Chelisoches morio* Fab., an insect hitherto unknown from the United States.* Correspondence with the collector elicited the information that they were taken some miles from Menlo Park in peach trees. They are probably importations from the Hawaiian Islands, where the species is common.

On May 18, 1906, Mr. Douglas Clemons found a single specimen of the small cockroach *Holocompsa nitidulus* Fab., in Washington, D. C. It was crawling on cotton batting from

* In 1900 (Ann. Soc. Ent. Belg., XLIV, p. 51) Burr records it as questionably occurring in North America.

the store room at the National Museum. This handsome little roach is found in the West Indies and Mexico, as well as in Central and South America. The members of the genus are easy of dissemination and are fast becoming cosmopolitan, and one or more species will very surely become permanent residents within our borders.

On October 9, 1905, Mr. J. C. Rounds, of Westwater, Utah, sent a female specimen of *Stagmomantis carolina* L. to the National Museum for determination. This, I believe, is the farthest western specific record for this insect, though some older general localities may include regions even farther west.

The writer has in preparation a catalogue of the Orthoptera of the United States and Canada which is intended for publication as soon as Professor Bruner completes his work on the *Biologia Centrali-Americana*, which includes many species that occur within our borders. The advancement made in the study of this order since the issuance of Scudder's catalogue seems to warrant a new catalogue being made. Certain names in present use that are untenable from one cause or another, usually nomenclatural in nature, will need changing. One such case follows:

Scudder^b describes what he supposed to be the *Caloptenus regalis* of Dodge, placing it in the genus *Æoloplus*. But, as stated by Professor Bruner in a letter to the writer, the *C. regalis* of Dodge is a *Melanoplus* occurring in Nebraska and Colorado, specimens from the latter State sent me by Professor Bruner agreeing with the original description of Dodge. Thus the insect described as an *Æoloplus* by Scudder is, from a nomenclatural standpoint, without a name. The specific name *bruneri* is therefore proposed for it.

***Asemoplus rainierensis*, n. sp.**

Last year Mr. H. E. Burke brought me a pair of a new species of *Asemoplus* from Mt. Rainier, Washington. This year (July, 1906) I visited Mt. Rainier and found the insect present in Paradise Valley in vast numbers. So numerous, indeed, were they that the ground in places was fairly swarming with them, the grass and small plants being wholly destroyed by the myriads of these small grasshoppers. Associated with the new species was an equal number of an apterous species which was described by Walker from Canada as *A. nudus*. Superficially the new species bears a very close resemblance to Walker's species but structurally it is quite distinct. From *Asemoplus montanus* Bruner, however, the new species is less easily sepa-

^b Rev. *Melanop.*, p. 71.

rated. When compared directly with the types of this last species, however, it is seen to be amply distinct. The three species of the genus may be separated as follows:

1. Tegmina present2
 Tegmina absent*nudus* Walker.
2. Cerci of the male about two and one-half times as long as the basal width, reaching the tip of the supra-anal plate and apically curved somewhat downward; pronotal disk of both sexes transversely convex, passing insensibly into the lateral lobes without indication of lateral carinæ*montanus* Bruner.
 Cerci of the male no more than twice as long as the basal width, scarcely attaining the tip of the supra-anal plate and in no way apically decurved; pronotal disk of both sexes transversely less convex above, passing more abruptly into the lateral lobes, forming distinct but rounded lateral carinæ.....*rainierensis*, n. sp.

In coloration *rainierensis* is similar to *montanus*, except that the infuscation on the lateral lobes of the pronotum does not extend so far downwards, making a more distinct lateral stripe. The abdomen above is usually broadly yellow, rarely with a narrow broken dark median line. The frontal costa of the female is more distinctly sulcate than in *montanus*, and the eyes are not so widely separated, the interspace being about three times as broad as the basal segment of the antennæ, while in *montanus* it is about four times as broad. The posterior margin of the pronotum is angularly concave, much more so, especially in the female, than that of either *montanus* or *nudus*.

The measurements of a mature pair chosen as types from a large number of specimens are as follows: Length, antennæ, male and female, 7 mm.; pronotum, male, 3.5 mm., female, 4.5 mm.; posterior femora, male, 9 mm., female, 11 mm.

Type.—No. 10707, U. S. National Museum.

There is little variation in size. The color of living specimens is very different and much brighter than that of specimens preserved either pinned or in spirits, no matter how well prepared by stuffing.

Out of nearly one hundred specimens of both sexes examined, but one specimen was found with either elytron missing, that one a female with the left elytron gone. Professor Scudder states that one half or more of all specimens of *montanus* seen by him had one of the tegmina gone. This is not true, however, of the few specimens of that species seen by me.

A FEW NEW COLEOPTERA OF THE GENUS BITOMA, WITH NOTES ON OTHER COLYDIIDÆ.

By CHAS. SCHAEFFER.

This paper is based largely on the material in the genus *Bitoma* contained in the Hubbard & Schwarz collection of Coleoptera in the U. S. National Museum. Through the kindness of Mr. Schwarz I have been enabled to study this material, and, as will be seen in the following pages, several of the species have proved to be new. Among the material sent me by Mr. Schwarz are two more species which are apparently new, but as I was unable to find a good structural character to separate them from their nearest allies, and as they were represented by single specimens only, I leave these for the future, when more material will be available.

The sculpture of the metasternum of most of our species of *Bitoma* may be called granulose. In some species the granules are distinct, but slightly elongated; in others they are longitudinally confluent, giving the surface a strigose appearance which is especially strongly pronounced in *ornata*, *quadriguttata* and *pinicola*, but in *vittata* more feebly and the granules hardly confluent. In *discolor* the sculpture of the metasternum is feeble, but slightly more distinct than in *prosopis* and *suffusa*.

The sculpture of the elytral intervals in pale specimens looks at first entirely different than in dark specimens of the same species; this is rather misleading, especially as in certain species the sculpture in dark specimens is more difficult to make out clearly than in pale specimens.

TABLE OF THE SPECIES OF BITOMA.

1. Antennæ with ninth joint as wide as the eighth.....2
Antennæ with ninth joint wider than the eighth.....9
2. Semicylindrical, thorax longer than wide, narrowing from apex to base, elytra strongly carinate.....*carinata* LeConte.
Depressed, thorax as wide or wider than long.....3
3. Thorax much narrower at base than at apex; elytral intervals on each side with two rows of tubercles, these two rows separated by a nearly smooth median line; color piceous, each elytron with a longitudinal reddish vitta not extending quite to apex...*vittata*, n. sp.
Thorax not or very feebly narrower at base than at apex.....4
4. Metasternum nearly smooth7
Metasternum longitudinally strigose5
Metasternum finely granulate, the granules at base slightly longitudinally confluent; color piceous, the humeri sometimes slightly paler, thorax strongly transverse.....*quadricollis* Horn.

5. The two lateral thoracic costæ very distinct.....6
 The inner of the two lateral thoracic costæ obsolete at apex, visible at base, but not as sharply as the outer; color piceous, with four scarcely visible reddish spots on each elytron, an oblique one near base, a small rounded spot near side margin at middle, a slightly larger one at apical third, and a small very indefinite spot slightly below this, these spots rarely well defined or absent..*pinicola*, n. sp.
6. Each elytron with one or two reddish spots; an oblique one near base and a round spot at apical third, the latter sometimes absent.
ornata LeConte.
 Each elytron with three or four reddish spots.....*quadriguttata* Say.
7. Elytral intervals on each side with a row of well separated, small, round, perforate punctures, the rows separated from each other by a slightly uneven median line; color testaceous, head, thorax, four elytral spots, and apex darker.....*discolor*, n. sp.
 Elytral intervals with two rows of more or less coarsely confluent large punctures, giving the intervals a rugulose appearance.....8
8. Mandibles not visible from above, covered by the large clypeus; color piceous, with base largely and an indefinite spot near apex reddish*prosopis*, n. sp.
 Mandibles more or less visible from above; color variable, piceous, elytra with basal and apical reddish-testaceous spot, or the spots may become larger and confluent, leaving only the suture narrowly and side margins darker.....*suffusa* Casey.
9. Reddish testaceous, head and thorax darker, elytral intervals on each side with one row of tubercles, leaving at middle a narrow longitudinal, nearly smooth space.....*sulcata* LeConte.

DESCRIPTIONS OF SPECIES.

***Bitoma vittata*, n. sp.**

Elongate, thorax distinctly narrowing from apex to base, piceous, opaque, each elytron with a longitudinal reddish vitta not quite attaining the apex. Head granulate, finely and sparsely pubescent, ninth joint of antennæ not wider than the eighth. Thorax broader than long, distinctly narrowing to base, apical angles not prominent, side margins finely crenulate, disk with two costæ on each side, the inner not as distinct as the outer, surface granulate. Elytra distinctly broader than the thorax at base, with three discal and one submarginal costæ, which are sparsely pubescent with short pale hairs; intervals with two rows of tubercles, the two rows of tubercles separated by a nearly smooth, longitudinal median space. Metasternum not coarsely granulate, the granules slightly longitudinally confluent; abdomen feebly punctate and sparsely pubescent.

Length, 2.75 mm.

Brownsville, Tex., one specimen in the Hubbard & Schwarz collection, collected by Mr. E. A. Schwarz.

Type.—No. 10443, U. S. National Museum.

This species has the thorax more distinctly narrowing to base than any other species known to me, which character, together with the elytral sculpture and markings, makes it an easily recognizable species.

I have taken a specimen in Brownsville which is reddish testaceous, with suture and side margins slightly infuscate, but which does not differ otherwise; this is evidently not fully colored yet.

***Bitoma pinicola*, n. sp.**

Elongate, depressed, form of *quadriguttatus* Say, but slightly broader, more depressed, the markings at best feebly defined and slightly different in position: Head opaque, black, paler at apex, granulate and very sparsely pubescent. Thorax broader than long, sides slightly arcuate, margins feebly crenulate, disk on each side with two costæ, the outer distinct, the inner feeble and obliterated near apex; surface granulate, piceous and scarcely pubescent. Elytra scarcely wider than the thorax, disk with four slightly elevated costæ, intervals with two rows of coarse punctures, which are scarcely confluent; color piceous, with four not very well defined red markings on each elytron, of which a narrow oblique humeral and an apical rounded spot are more visible than the two others; one of them is situated near side margin between the humeral and subapical spot and the other slightly below the subapical, the latter at about apical third. Body beneath and legs piceous; metasternum longitudinally strigose.

Length, 3 mm.

Lakehurst, N. J., on pine.

This species resembles *quadriguttatus*, but is broader, more depressed, the elytral sculpture not as coarse as in that species; the position of the subapical spot is different, which is in *quadriguttatus* oblique and slightly behind middle, in *pinicola*, when present, apparently rounded and at apical third and the thoracic costæ, especially the inner, are never as distinct as in *quadriguttatus*. In the type the markings can be traced and are as above described; in a few others the markings are either absent or only the humeral and subapical can be feebly seen.

***Bitoma discolor*, n. sp.**

Elongate, depressed, opaque, pale rufotestaceous; head, thorax, four spots, and apex of elytra darker. Head finely granulate, sparsely pubescent; antennæ with ninth joint not wider than eighth. Thorax

nearly as long as broad, feebly narrowing to base, apical angles distinct, basal angles rectangular, base feebly lobed, side margins irregularly crenate, disk with four costæ as in *quadriguttatus*, surface granulate. Elytra slightly wider than the thorax at base, with the usual four costæ, which are very prominent and slightly crenate at their summit; intervals with two rows of well separated round perforate punctures, separated by a broad, nearly smooth, longitudinal median line; color rufotestaceous, with darker markings as follows: One at scutellum, one slightly below middle at suture, one on each side near side margin, between the scutellar and sutural spot and apex more or less piceous. Metasternum and abdomen obsoletely punctate and sparsely pubescent.

Length, 2.75-3 mm.

Biscayne Bay and Key West, Fla.; Cayamas, Cuba. For the Biscayne Bay specimens I am indebted to Mrs. A. T. Slosson; the Key West and Cayamas specimens were collected by Mr. E. A. Schwarz.

Type.—No. 10445, U. S. National Museum.

The apical dark elytral space is variable in extent and is connected in some specimens with the marginal spots. The elytral spots in some specimens are darker than in others. The coloration, as well as the sculpture, distinguishes this species readily from any of our species.

***Bitoma prosopis*, n. sp.**

Elongate, piceous, opaque, sparsely pubescent; elytra with four not clearly defined reddish spots, two occupying basal third, leaving suture and sides narrowly piceous and two near apex. Head nearly smooth, opaque, sparsely pubescent; antennal club two-jointed; clypeus covering the mouth parts. Thorax slightly broader than long, apex and base equal, feebly arcuate at sides, side margin finely crenulate, the inner of the two lateral costæ nearly obsolete, disk finely granulate and sparsely pubescent. Elytra very little wider than the thorax at base, with four elevated discal costæ, which on their summit are slightly crenulate and clubbed with short white hairs; intervals with rows of large coarse punctures, more or less transversely confluent, giving them a rugulose appearance. Body beneath ferruginous, opaque; metasternum and abdomen feebly punctate and sparsely pubescent.

Length, 2 mm.

Two specimens, one from New Braunfels, Tex., in Coll. Dietz, the other from San Diego, Tex., in the Hubbard and Schwarz collection, U. S. Nat. Museum; the latter was collected May 23 by Mr. E. A. Schwarz, whose manuscript name I have used.

Type.—No. 10444, U. S. National Museum.

This species can only be compared with the darker specimens of *suffusa* Casey, from which it principally differs in smaller size, coarser sculpture of the elytral intervals, and longer clypeus, which covers the mandibles completely, the latter always more or less visible in *suffusa*.

***Bitoma suffusa* Casey.**

Mr. Schwarz is of the opinion that this species is synonymous with *gracilis* Sharp. This view is very likely correct, but the description is not sufficient to identify the insect with certainty, and as some of the species are very close I retain for the present Casey's name for this species.

A few specimens before me, collected by Mr. Schwarz in Yuma, Ariz., are slightly larger, darker in color, and in some the sculpture of the intervals is coarser, but I am not able to find at present a good character to separate these from the lighter colored specimens.

***Phlaeonemus catenulatus* Horn.**

P. adharens Sharp.

Mr. Schwarz suggested the above synonymy to me. The description and excellent figure of the Guatemalan insect agree so well in every respect with our species that there is no doubt of the correctness of this view. A few specimens occurred at Brownsville, Tex., with the typical form, with which they agree in every respect except that the elytral costæ are several times interrupted; these may be Reitter's *interruptus*, which is said to be 7 mm. long, while my largest specimen is 5 mm.

***Lithophorus succineus* Pasc.**

I bred a few specimens of this fine species from branches of *Acacia flexicaulis*, and also obtained some by beating. The genus *Lithophorus* is a member of the tribe Bothriderini and differs principally from the two genera in our fauna by the form of antennæ; the joints 7, 8, and 9 slightly increasing in width, 10th much larger than the 9th, 11th very small, hardly visible. The species is black, nearly of the form of *Bothrideres geminatus*, but larger and more convex; thorax uneven, with a depression at middle and tuberculate at sides, the third and fifth elytral intervals with interrupted costæ, each costa at middle with a transparent yellow spot, "like a jewel or piece of amber," as Dr. Sharp so aptly describes them; at sides and apex are a number of tubercles and granulations.

Lobogestoria gibbicollis Reitter.*Aditoma bifida* Casey.

Looking over some Cuban coleoptera in the National Museum with Mr. Schwarz, I recognized in *Lobogestoria gibbicollis* what I had identified as *Aditoma bifida*. Mr. Schwarz kindly gave me a Cuban specimen for comparison with my insect, which is from Louisiana, but I was unable to find any character to separate the two. Reitter described his species as a lathridiid on account of the three-jointed tarsi, of which no mention was made by Major Casey in the description. Casey's specimen came from Florida.

A WONDERFUL NEW BEETLE OF THE GROUP COPRIS.

By EDWARD A. KLAGES.

Tetramereia, n. gen.

Form rounded; legs strong. Head clypeate; thorax wider than long, broadest before middle; elytra subtruncate; metasternum rhomboidal (as in *Phanæus* MacLeay), not projecting anteriorly (a character of *Oxysternon* Castelnau). Antennæ nine-jointed, the first joint of the club roundly infundibulate and receiving the others. Tarsi four-jointed, widely flattened, edged with moderately short, stiff hairs, and with the superior surface inclined toward the center of the body; the first joint as long as the rest of the foot, the second joint half as long as the first, the third joint scarcely longer than the fourth; the first three joints as wide as long and somewhat reniform; the claws and anterior tarsi wanting. Fore tibiæ with a movable, terminal spine and with the outer edge toothed; the hind tibiæ with a single terminal spine, the middle and hind tibiæ expanding to apex.

Type: The following species:

Tetramereia frederickii, n. sp.

Brown-black; head and thorax rather densely punctured, becoming rugose on front; clypeus emarginate, with two rounded teeth; thorax with median lateral impression, and with the basal portion feebly impressed on medial line; elytra rather deeply striate and finely punctured; front tibiæ four-dentate, the outer three teeth large.

Length, 15 mm.

Suapure, Caura Valley, Venezuela, July 5, 1899.

Type.—Collected by the author and forming part of his collection.

Named in memory of my brother, Frederick W. Klages,* who died Mar. 28, 1886, at the age of 27 years.

The specimen above described is seemingly a small female. The head has the rudiments of a horn and the thorax has a transverse ridge near the front margin. Analogous processes are observable in small females of certain species of the genus *Phanæus*, to which this is very closely related.

DECEMBER 6, 1906.

The 209th regular meeting was held at the residence of Dr. C. W. Stiles, 1412 Hopkins street, N. W. President Banks occupied the chair and the following persons were present: Messrs. Banks, Barber, Burke, Busck, Caudell, Currie, Davis, Dyar, Fiske, Gill, Heidemann, Hopkins, Howard, Johnson, Knab, Marlatt, E. F. Phillips, Reeves, Sasscer, Stiles, Titus, and Webb, members, and Messrs. C. E. Burden, C. B. Dyar, Dudley Moulton, and Dr. Reid Hunt, visitors.

Officers for the ensuing year were elected as follows: President, A. D. Hopkins; First Vice-President, O. Heidemann; Second Vice-President, E. A. Schwarz; Recording Secretary, W. F. Fiske; Corresponding Secretary, J. G. Sanders; Treasurer, J. D. Patten; members of the Executive Committee, in addition to the officers, Harrison G. Dyar, L. O. Howard, and C. L. Marlatt. Dr. A. D. Hopkins was nominated to represent the Entomological Society of Washington as a vice-president of the Washington Academy of Sciences.

Mr. Webb exhibited a rare cerambycid beetle, *Brothylus conspersus* Lec., collected by Mr. H. E. Burke in the Yosemite National Park, Cal., the past season.

* Fred. W. Klages was the first naturalist of the family and one of the pioneer entomologists of western Pennsylvania. He collected in the South and in Jamaica and rediscovered and made known the habitat of the hitherto exceedingly rare butterfly, *Papilio homerus* Fab. The late Dr. John Hamilton, in his "Catalogue of the Coleoptera of South-western Pennsylvania," gave his name as "William," an error until now uncorrected.

—Mr. Burke showed a rather rare tussock moth from the Yosemite National Park, Cal., *Notolophus oslari* Barnes. He stated that investigation proved to him that this species was responsible for the bare tops frequently seen in that portion of California in the California white fir (*Abies concolor*). From larvæ kept under observation were reared *Chalcis ovata* Say, *Tachina mella* Walk., and some braconids. A comparison of the egg-masses of this species with those of three other well-known tussock moths, namely, the white-marked tussock moth (*Hemerocampa leucostigma* S. & A.), the gipsy moth (*Porthetria dispar* L.), and the rusty tussock moth (*Notolophus antiqua* L.) is interesting; whereas the white-marked tussock moth surrounds its egg-mass with froth, and the gipsy moth's egg-mass is covered with hair, that of *Notolophus oslari* is surrounded with both froth and hair, while that of *Notolophus antiqua* is bare. Doctor Dyar stated that *Notolophus oslari* was described from Colorado and this California record of Mr. Burke was new; both the larva and the female were undescribed. Mr. Burke stated that the larvæ strip the fir trees from the top down for a distance of about 10 feet, thus destroying the seed crop. Doctor Howard suggested that *Pimpla inquisitor* Scop. be introduced into California from the Eastern United States to parasitize the *Notolophus*. Doctor Hopkins said that he found *Notolophus oslari* ovipositing, in October, 1905, on the trunks and branches of fir trees which had been defoliated by the larvæ, near Colorado Springs, Colo., and on visiting the same locality the following June he found that the eggs were hatching. Some of the egg masses were collected, which later yielded a large number of egg parasites. Doctor Howard remarked that these egg parasites found by Doctor Hopkins might prove useful for introduction into the East to combat the white-marked tussock moth, the gipsy moth, and the brown-tail moth (*Euproctis chrysorrhæa* L.).

Mr. Schwarz pointed out that this California record for a Colorado species was an illustration of the fact that the faunas of the eastern slope of the Sierra Nevada Mountains and the western slope of the Rocky Mountains are closely related. The real Pacific fauna is that of the Coast Range alone. Many persons,

Mr. Schwarz said, erroneously considered the fauna of the Rocky Mountains as radically different from that of the Sierra Nevada. The faunas of the Wasatch Mountains of Utah—a spur of the Rocky Mountain system—and that of the Sierra Nevada in the vicinity of Lake Tahoe, California, are remarkably alike. There is in the U. S. National Museum a list of Coleoptera collected by the late H. G. Hubbard on the Wasatch Mountains, Utah, and another list of Coleoptera collected by Mr. Hubbard in the same year at Lake Tahoe. A comparison of these two lists would illustrate the affinities of the two faunas. Doctor Hopkins then discussed the relation of bark-beetles to the faunal regions of the eastern and western sections of the Rocky Mountain and Pacific Coast areas and the evident value of these insects in defining local divisions and sections of these regions as distinguished from those defined by their host plants. He contended that in determining faunal regions one should study groups of insects rather than single species. Mr. Schwarz said that it was necessary to have experience to know what group to single out for study as aiding in the determination of zoogeographical regions. As an instance he cited the carabid genus *Nebria* as admirably adapted for illustrating geographical distribution, not only as between the Boreal and Transition zones, but also as between the Rocky Mountain system and the Sierra Nevada.

—Mr. Busck showed some colored illustrations of Walker's types of Microlepidoptera prepared for the U. S. National Museum by an artist in the British Museum.

—Doctor Howard mentioned a rather amusing incident in connection with Mr. George Compere's efforts to introduce parasites of the codling moth (*Carpocapsa pomonella* L.) into California from Europe. When the parasites arrived at their destination no codling moth larvæ could be found to which to transfer them, and larvæ had to be shipped in cold storage from New Zealand to California to meet the emergency.

—Mr. Knab stated that he had come to the conclusion that the character of toothed or untoothed claws in adult mosquitoes would not define generic limits, for he had discovered that this character is subject to variation, sometimes even within the same species.

—The first paper of the evening, an abstract of which follows, was by Doctor Howard:

POLYEMBRYONY AND THE FIXATION OF SEX.

By L. O. HOWARD.

(Author's Abstract.)

The speaker described his early observations on strange methods of pupation among the Chalcididae (American Naturalist, 1882; Insect Life, Vol. IV, 1891; and Proceedings of the U. S. National Museum, 1892), indicating the existence of certain unexplained phenomena in the development of certain hymenopterous parasites of the family Chalcididae, which have subsequently been cleared up by the discovery of Marchal of the existence of the extraordinary process known as polyembryony, by virtue of which from a single egg there may come very many adult individuals. He reviewed the work of Bugnion on the anatomy and habits of *Encyrtus fuscicollis* (1891), a note by Giard (1898), and several papers by Paul Marchal culminating in his startling work entitled *Recherches upon the Biology and the Development of Parasitic Hymenoptera—Specific Polyembryony or Germinogony* (1904). He further reviewed a paper by F. Silvestri entitled *Contributions to the Biological Knowledge of Parasitic Hymenoptera: (1) Biology of Litomastix truncatellus* (1906); and the admirable summary of Marchal's work by Bugnion, also published in 1906. The paper in full up to this point is published in *Science*.^a

The speaker then called especial attention to the extreme interest attaching to further observations of this wonderful life process, and dwelled upon the abundance of material for study existing on every hand, the requirements for its investigation, now that the initial discoveries have been made, being simply good laboratory facilities and a skilled technique together with trained powers of observation. These are to be found with many institutions and many individuals in this country, and there is every hope that before long the darkness that has existed in our knowledge of the intimate early life history of the parasitic Hymenoptera will be changed into the bright light of accurate knowledge.

The speaker exhibited a large series of species of the encyrtid genera *Copidosoma*, *Litomastix*, and *Ageniaspis*, together

^a *Science*, n. s., Vol. XXIV, No. 625, December 21, 1906, pp. 810-818.

the very numerous pteromalid parasites of larger Lepidoptera, also with many of the forms of the family Eulophidæ as defined by Ashmead, and especially perhaps in the subfamilies Entedoninæ and Tetrastichinæ, and some at least of the Elachistinæ, we may hope to find this mode of development. We have only to remember the manner in which a lepidopterous chrysalis is sometimes packed with parasites of the genus *Cirrospilus*, or a large ichneumonid larva with *Dibrachys*, to see the force of this suggestion.

Apanteles among the Braconidæ also naturally occurs to one, and the great number of larvæ issuing from a large sphingid larva is readily explicable by polyembryony, and this offers an easy and important field of investigation. For many years, the speaker said, he had had parasitized sphingid larvæ in different stages upon his desk awaiting the opportunity for dissection, but the chance had never come.

With the proctotrypids, Marchal has already shown us what occurs with *Polygnotus* and also what is to be expected with other forms of the subfamily *Platygastrinæ* (and here the speaker referred to a published announcement in the Bulletin of the Entomological Society of France for October, 1906, of the publication of Marchal's paper upon this group); and other subfamilies will bear investigation.

That polyembryony is a highly specialized function, and with insects one of the concomitants of parasitism, seems likely. It is therefore not to be expected in groups in which the parasitic mode of life is not old and firmly established for a very long period of time. With the parasitic Diptera, therefore, where from the non-specific character of the host relation it is to be assumed that the parasitic mode of life is of comparatively recent acquirement, polyembryony is not to be expected to exist. The large number of *Tachina* eggs with which a lepidopterous larva is frequently plastered is an indication of this.

In the discussion of the paper Mr. Reeves stated that he had found larvæ of the Hessian fly filled with the parasitic larvæ and pupæ of *Polygnotus*, upon which the transparent skin of the host larva had shrunk so as to lose its own form and reveal nothing but the contained mass of parasites. The largest number of parasites found in a single host larva was 41, the usual number ranging from 6 to 12. Doctor Stiles remarked that the figures of Marchal were very suggestive of

those illustrating the development of the malaria parasite and that this polyembryony suggested the alternation of sexual and asexual generations found in Protozoa and the trematodes. As the rate of increase by the asexual mode is much more rapid than that by the sexual mode it is fortunate for humanity that in the case of the malaria parasite the period during which reproduction can continue by the asexual mode alone is limited. Certain phenomena resembling polyembryony, occurring in other forms of animal life, were pointed out by various members present, and Doctor Phillips spoke of the artificial production of half and quarter embryos by chemical and mechanical means and also referred to the work of Doctor Conkling on ascidians, which seems to contradict the Mosaic theory of development.

—Mr. Banks presented the following paper:

THE PSYCHODIDÆ OF THE VICINITY OF WASHINGTON.

By NATHAN BANKS.

For several years I have taken some interest in collecting the Psychodidæ wherever I have resided, and have now a dozen species from the vicinity of Washington, four of which are new. These tiny, delicate flies are not easily preserved for the cabinet; it is necessary that they be mounted soon after capture, and that no other insects be in the vial with them; so that unless one goes especially prepared to catch them, his captures will not be worth much.

I have not had the facilities to attend to the rearing of any of the species, but offer notes on the habits and habitats of some of the forms. I am inclined to think that most of our species do not live in water, but only in moist places.

***Psychoda alternata* Say.**

Our most common species, taken in June, July, August, and November. It is often found resting on out-buildings, and doubtless breeds in muddy spots adjoining them.

***Psychoda cinerea* Banks.**

Occurs on manure in the fields and woods, often far from

water, and evidently breeds in the manure. Falls Church, Va.; High Island, Maryland; April to November.

***Psychoda minuta* Banks.**

Taken at Falls Church, Va., in April, May, and October. It is sometimes seen flying around the lamp on warm summer nights.

***Psychoda nigra* Banks.**

Not uncommon near streams, resting on rocks, under bridges, and under leaves of plants overhanging the water. Falls Church and Glencarlyn, Va., in May, July, and August.

***Psychoda superba* Banks.**

On the trunks of large trees in moist and shady places near streams; Washington, D. C., and Falls Church, Va., June and July.

***Psychoda nitida* Banks.**

The only specimens seen were taken on the trunks of large trees on Fourteenth Street, Washington, D. C., in August.

***Psychoda signata* Banks.**

Also taken on trunks of trees, Washington, D. C., in July.

***Psychoda opposita* Banks.**

Taken in June and July in Washington, D. C., on trunks of trees.

***Psychoda quadripunctata*, n. sp.**

Head black, some whitish-gray hair above; antennæ dark brown, tapering; thorax black, densely clothed with whitish-gray hair above, and jet-black hair behind near the abdomen; the latter black, with mostly black hair, a streak of whitish hair each side toward tip; legs blackish, the tarsal articles white at the tips. Wings with grayish-white hair on basal part along the second vein, and near the anal margin; on the basal part are four tufts of erect jet-black hair, one near costal margin near base, one on anal margin at end of whitish hairs, and two on the discal part of wing just before the middle; costal fringe long, jet-black, interrupted just beyond the middle and just before the tip by patches of snow-white hair, two similar patches in

posterior fringe, one near tip and one at middle, rest of fringe dark brown and extremely long; on the margin the veins end in minute black spots.

Expanse, 2.8 mm.

One specimen from Falls Church, Va., 15 May. A very handsome species.

***Psychoda interrupta*, n. sp.**

Head and thorax densely clothed with whitish hair above, some gray on the middle of the thorax; antennæ with gray hairs, tapering; abdomen black, some white hair each side at tip; legs pale, marked toward the tips with blackish, the hind tibia blackish at tip, the basal and apical tarsal joints mostly black. Wings gray on basal part, with few hairs, more densely haired on apical part and more or less dark brownish, in some specimens a faint appearance of three dark bands, one apical, one at middle, and one near base; costal fringe gray, white near tip; apical fringe snow-white, at outer anal angle a broad patch of black fringe, basal of it is white, and then brownish. In the apical part of the costa in well-marked specimens, are three small white spots, slightly indenting the wings from the costal margin.

Expanse, 2.4 mm.

Several specimens from Plummers Island, Maryland, 24 July, 28 August, attracted to the light.

***Psychoda basalis*, n. sp.**

Head and thorax with brownish hair, a prominent tuft of white hair on face; antennæ black; thorax rather yellowish brown; abdomen black, with black hair; legs black, with some scattered white hairs, rather longer than usual. Basal half of wing jet black, made so by dense hairs from the veins, a tuft of gray at extreme base; beyond the middle of wing the hair is grayish and sparse; basal, costal, and posterior fringes black, apical fringes less dense and grayish, although the extreme tip is jet black. Allied to *P. bicolor* Bks., but distinct by dark gray hair on thorax (white in *P. bicolor*), and by darker legs, etc.

Expanse, 3.1 mm.

Several specimens from Falls Church, Va., May 7 to 15.

***Psychoda apicalis*, n. sp.**

Head and thorax with grayish-white hair above, brownish behind on the thorax; antennæ and legs jet-black; abdomen densely gray-haired. Wings rather broad, black, some grayish-white hair on basal

part; near the middle are two darker discal patches, rather indistinct; costal fringe jet-black, anal fringe rather more brownish, latter quite long, at apex of wing is a broad patch of snow-white fringe. Hind tibiae with a fringe of long black hairs behind. Markings similar to *P. marginalis* Banks, but it is a blacker insect, with black tarsi (honey-yellow in *P. marginalis*).

Expanse, 3.5 mm.

One specimen from Falls Church, Va., 17 July.

Mr. Knab spoke of the finding, by Mr. J. B. Van Duzee, of a psychodid larva in water between the leaves of a *Bromelia* in Florida. The adult, on examination, seemed to be a new species. Another psychodid larva he himself found to be very abundant in moisture at the margin of a sewer outlet in Mexico. Mr. Barber referred to his former note before the Society (see p. 102) on a blood-sucking psychodid, *Flebotomus* sp., found in Guatemala, and stated that a species of *Flebotomus*, had lately been discovered by him at Plummerville Island, Maryland, and that this species had the same annoying habit.

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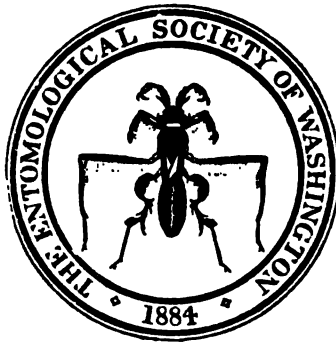
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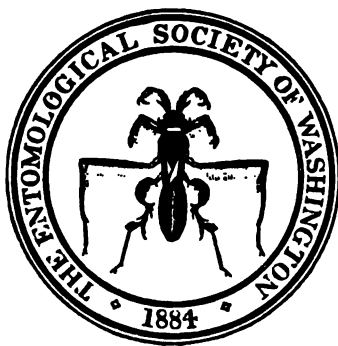
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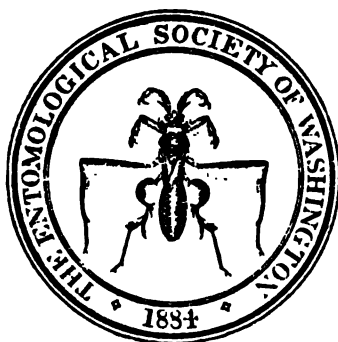
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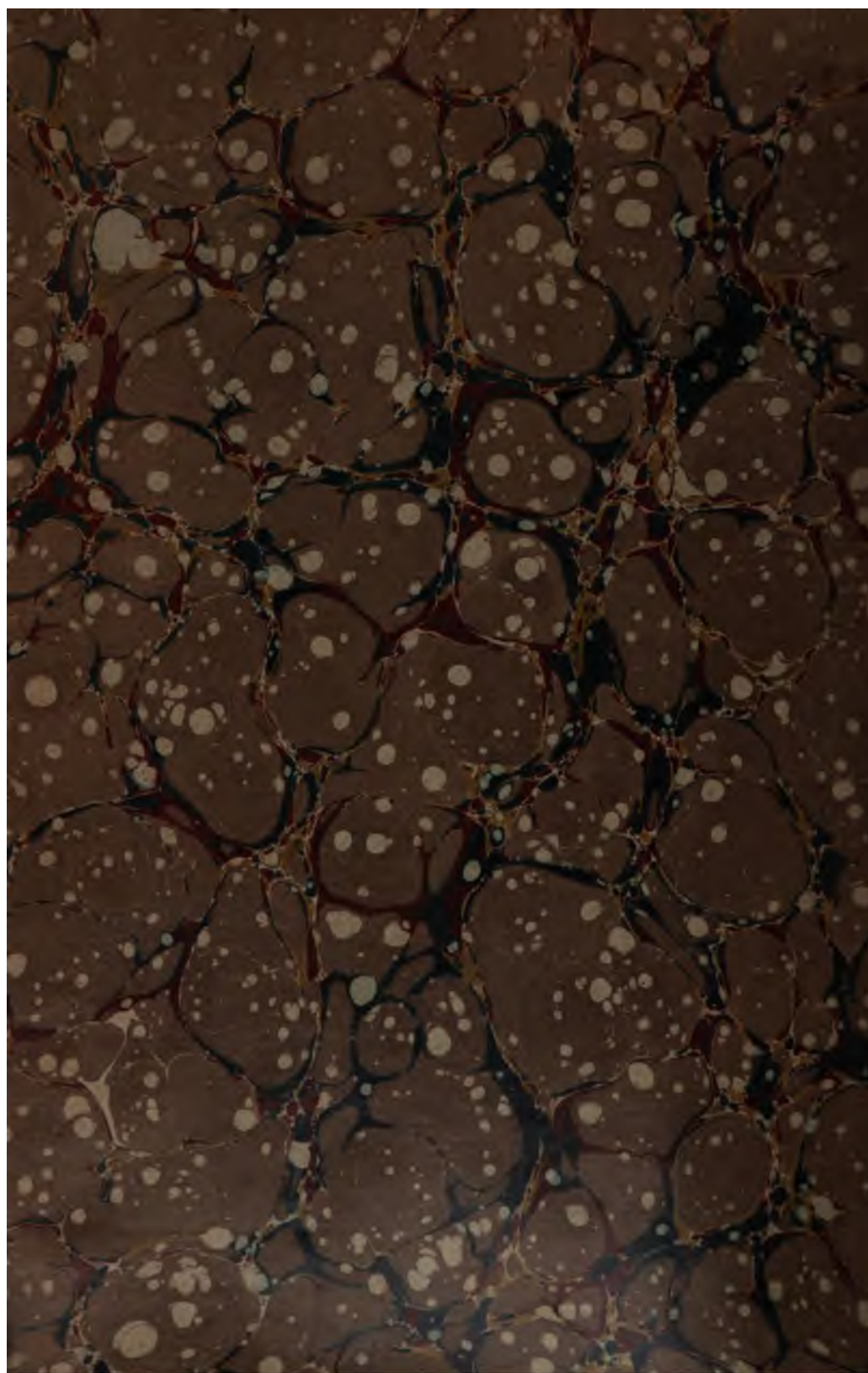
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